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Results of Modern Alluvium Sampling, Coral Rapids Area, Northeastern Ontario: Operation Treasure Hunt—Kapuskasing Structural Zone

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Results of Modern Alluvium Sampling, Coral Rapids Area, Northeastern Ontario: Operation Treasure Hunt—Kapuskasing Structural Zone

by

Ontario Geological Survey

2001

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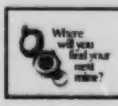

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**Miscellaneous Release—Data 87

Modern Alluvium Data Release, Coral Rapids Area, Northeastern Ontario: Operation Treasure Hunt.

by Ontario Geological Survey.

This release consists of data related to kimberlite indicator minerals (KIMs), metamorphosed magmatic/massive sulphide indicator minerals (MMSIMs®), carbonatite indicator minerals and gold grains recovered from modern alluvium samples collected in the Coral Rapids area, northeastern Ontario. The data are being released in conjunction with Open File Report 6068. Files on this release contain information on abbreviations used; sample site locations; KIM counts; microprobe data for KIMs (e.g., garnets, chromites, Mg-ilmenites, olivines, and pyroxenes); MMSIMs®; microprobe data for MMSIMs®, gahnite; carbonatite indicator minerals; and gold grains. Data is available as self-extracting zip files in ASCII (.txt) and Microsoft Excel (.xls) file format on one 3.5-inch MS-DOS diskette.

This diskette is available separately from the report.

Abstract

In 2000 the Ontario Geological Survey (OGS) completed a modern alluvium sampling study in the Coral Rapids area of northeastern Ontario to determine the presence of kimberlite indicator minerals (KIMs), metamorphic/magmatic massive sulphide indicator minerals (MMSIMs®) and gold grains. This study was carried out as part of the Operation Treasure Hunt (OTH) program. Results showed the presence of a number of indicator minerals commonly associated with kimberlite and base metal deposits.

A number of important indicator minerals were recovered as part of this survey including 7 G10 Cr-pyrope garnets. Other KIMs recovered from the sampling program include: "G9" Cr-pyrope garnets; megacrystic garnets; eclogitic garnets; picro-ilmenites; kimberlitic chromites; kimberlitic Cr-diopsides; and forsteritic olivines. Nine important areas are highlighted that host sites with the most anomalous KIM counts based on both a variety of KIMs and total grain counts. These include: Mowbray Creek/Opasatika River south (area 1); Friday Creek/Opasatika River north (area 2); Pike River south (area 3); Pike River north (area 4); Onakawana/Abitibi River (area 5); Bad River/Little Abitibi River north (area 6); Little Abitibi River south (area 7); North French River (area 8); and Wakwayowkastik River (area 9). These areas are recommended as the most prospective areas to carry out kimberlite exploration in the Coral Rapids study area.

A number of metamorphic/magmatic massive sulphide indicator minerals were recovered including numerous chalcopyrites and gahnites. A significant chalcopyrite anomaly occurs on the Abitibi River at Coral Rapids and is traceable northwards up to the junction with the Little Abitibi River. This anomaly is important since approximately 900 chalcopyrite and 3500 pyrite grains were identified in a single sample collected at Coral Rapids (KAP-2181). This site is in very close proximity (1 km downstream) to the Valentine Township alkalic complex. A second less significant chalcopyrite anomaly occurs on the North French River in the southern portion of the study area. Gahnite anomalies are most significant on the Mattagami and Opasatika rivers. Sample KAP-1999 contained 32 gahnites as well as 84 chalcopyrite grains. The most important areas of interest and samples that exhibit anomalous distributions of MMSIMs® are highlighted in the report.

Numerous gold grains were recovered in the study area. The most significant recovery of gold grains was from a site north of Coral Rapids (KAP-2122) on the Abitibi River where 60 grains were isolated. Other important sites include locations on Adam Creek and the Mattagami River. The majority of gold grains identified in this study are reshaped indicating some degree of reworking and transportation in the secondary environment.

Results of Modern Alluvium Sampling, Coral Rapids Area, Northeastern Ontario: Operation Treasure Hunt—Kapuskasing Structural Zone

Ontario Geological Survey

Ontario Geological Survey
Open File Report 6068
2001

Compilation of data and written report by D.C. Crabtree. Project supervision by C.L. Baker and R.D. Dyer. Review by C.L. Baker and R.I. Kelly.

Introduction

Modern alluvium sampling for heavy mineral indicator grains was carried out over the Kapuskasing Structural Zone (KSZ) during the summer of 2000 as part of the Operation Treasure Hunt (OTH) program (Figure 1). This project is one of several geoscience projects being completed under OTH.

Traditionally, the modern alluvium sampling program of the Ontario Geological Survey (OGS) has undertaken medium to high density sampling over structurally favorable shield terrain in conjunction with Quaternary mapping. The Kapuskasing Structural Zone OTH project involved medium density (approximately 1 sample per 30 km^2) sampling over an area of approximately 65 000 km^2 in north-central Ontario. Approximately 2000 samples were collected and processed to isolate kimberlite indicator minerals (KIMs), metamorphic/magmatic massive sulphide indicator minerals (MMSIMs®*) and gold grains. Results for modern alluvium samples collected in the Kapuskasing-Fraserdale (Ontario Geological Survey 2001a), Chapleau (Ontario Geological Survey 2001b) and Foleyet (Ontario Geological Survey 2001c) areas have been previously released (Figure 2). The current report highlights the data and preliminary interpretation of the distribution of KIMs, MMSIMs® and gold grains for the 354 modern alluvium samples (Appendix A) collected from the 11 914 km^2 Coral Rapids section of the Kapuskasing Structural Zone OTH sampling survey (Figure 3).

Previous studies have shown that KIMs and MMSIMs® commonly occur in the Kapuskasing Structural Zone (Wolfe et al. 1975; Morris et al. 1994, Morris et al. 1997a, Morris et al.1998a, Stephenson et al. 1999). From 1994 to 1996 a combination of mapping and modern alluvium/soil sampling was completed in the Wawa region (Figure 2) in the southern part of the KSZ (Morris 1994, Morris et al. 1994, Morris 1996, Morris et al. 1997a). In 1997 and 1998, overburden mapping combined with till and modern alluvium sampling programs were initiated by the OGS over the KSZ south of Kapuskasing in the Woman Falls-Wakusimi River (Morris 1997, Morris et al.1998a) and the Opasatika-Roche Lake areas (Stephenson et al. 1999). Samples from all of these studies were processed for KIMs, MMSIMs® and gold.

The objective of the present OTH study was to complete a program of modern alluvium sampling to further evaluate the mineral potential of the KSZ area. Sampling and analysis were designed to identify: 1) the presence of KIMs and MMSIMs®; and 2) the background values for gold within modern alluvium of the Coral Rapids area and determine whether anomalous values were present.

Study Area

The modern alluvium sampling component of the OTH program covers a region that extends from south of Chapleau to north of Fraserdale. This region, which overlays the KSZ, has been sub-divided into 4 areas that include: the Chapleau; Foleyet; Kapuskasing-Fraserdale; and Coral Rapids areas (Figure 1). This report covers the Coral Rapids area.

The Coral Rapids area is represented on 13, 1:50 000 scale National Topographic System

*MMSIM is a registered trademark of Overburden Drilling Management Limited, Nepean, Ontario.

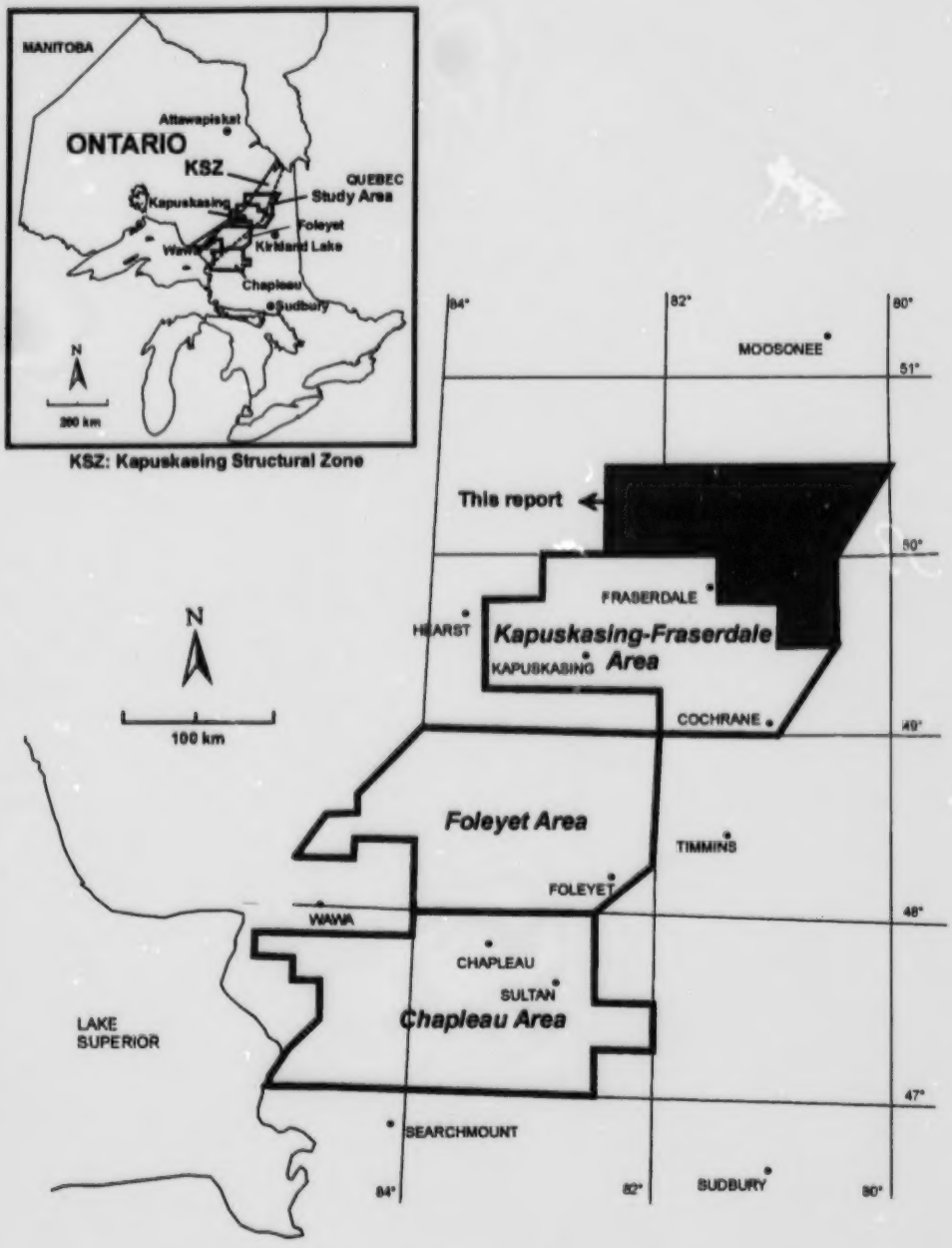
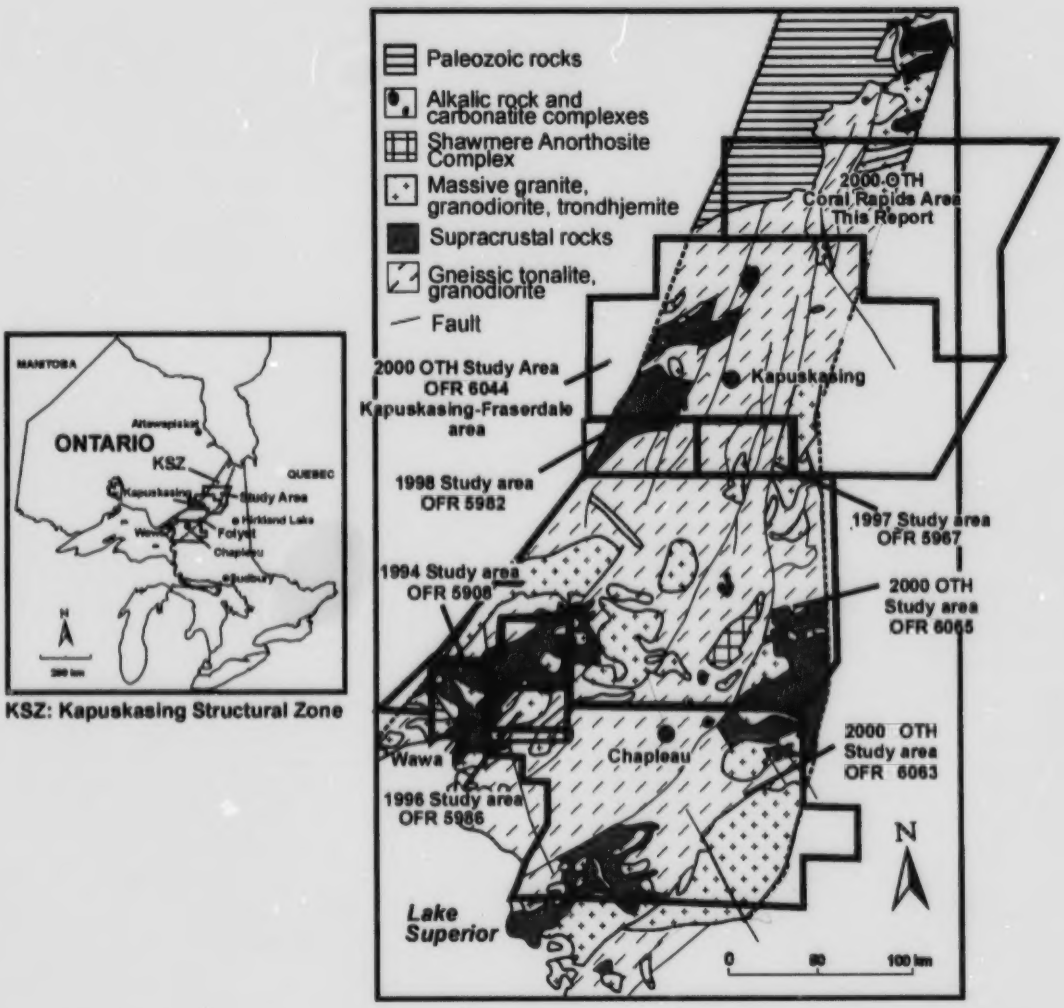


Figure 1: Location of the Operation Treasure Hunt, Kapuskasing Structural Zone, modern alluvium sampling project areas.



KSZ: Kapuskasing Structural Zone

Figure 2: Locations of the 1994, 1996, 1997, 1998 and 2000 OGS sampling programs and the approximate location of the Kapuskasing Structural Zone (KSZ)(Modified from Sage 1991).

(NTS) maps that include: Smoky Falls (42-J/1); Wawa Lakes (42-J/8); Ministik Lake (42-I/1); McParlon Lake (42-I/2); Audrey Lake (42-I/3); Coral (42-I/4); Ranoke (42-I/5); Lyla Lake (42-I/6); Wekweyaukastik Rapids (42-I/7); Kesagami (42-I/8); Montreuil Lake (42 H/10); Takwata Lake (42 H/14); and Tomorrow Lake (42 H/15).

The area is bounded by longitudes 80°00'W and 82°30'W and latitudes 49°30'N and 50°30'N (Figure 3, back pocket). Access to the Coral Rapids study area is poor as there are no major roads and only a limited number of secondary roads. A helicopter and boat were used to access areas not covered by a road network.

Physiography

The study area is located within 2 distinct physiographic regions. The northern part of the study area falls within the Hudson Bay Lowland while the southern portion falls within the Abitibi Upland physiographic region (Bostock 1970). All rivers in the study area flow northward into James Bay via 3 major drainage basins. These include the Moose River Basin, the Hurricana River Basin and a seaboard drainage system that controls the flow of a few minor rivers into James Bay (Chapman and Gosson 1985). The Moose River Basin can be subdivided into 4 minor drainage systems that include the Missinaibi, Mattagami, Abitibi and North French River drainage basins (Figure 4). The Kesogami River in the northeastern part of the study area flows into the Hurricana River which in turn flows into James Bay at its most southerly point.

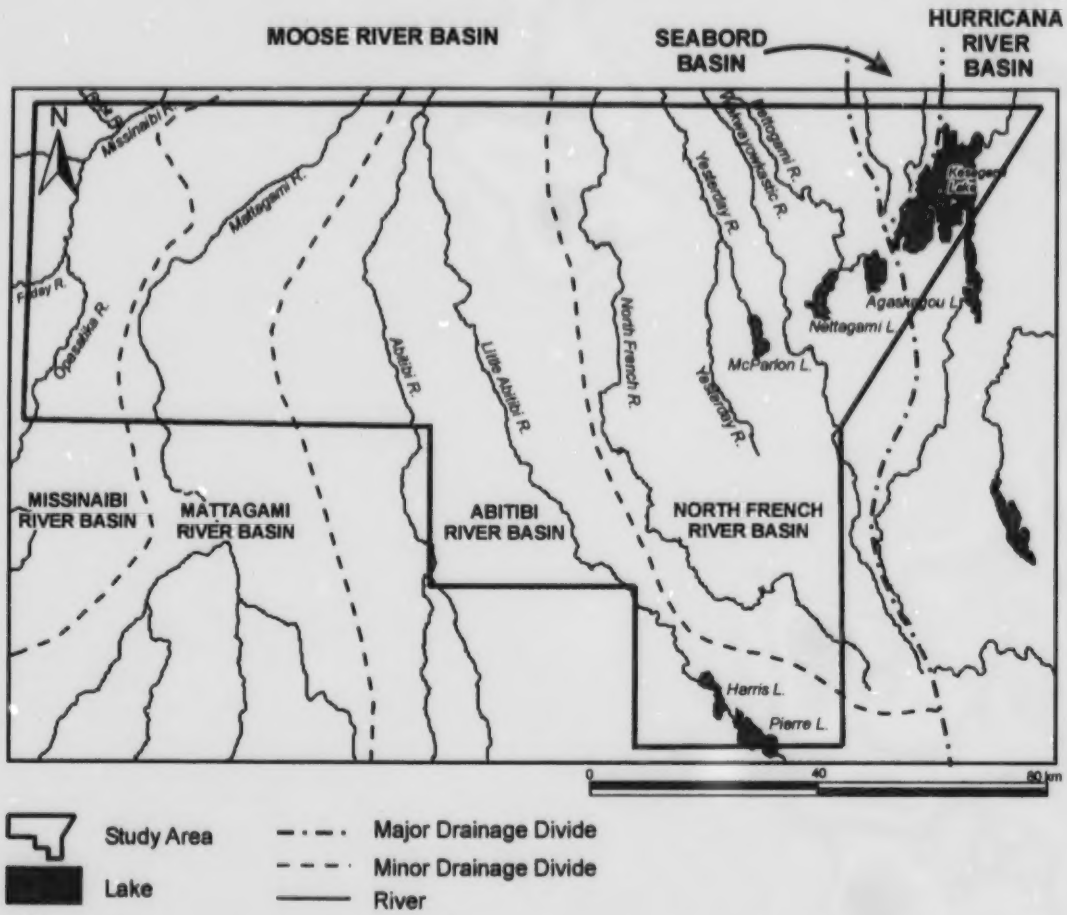


Figure 4. Approximate location of major and minor drainage basins in the Coral Rapids study area.

Regional Bedrock Geology – Coral Rapids Study Area

The bedrock geology of the Coral Rapids study area is characterised by both Archean rocks of the Superior Province and younger Phanerozoic cover of the Moose River Basin. The Phanerozoic rocks are located in the northwest corner of the study area. This area is characterised by both Paleozoic sedimentary rocks (Devonian sandstones, dolostones, limestones and shales) and Mesozoic sediments (Cretaceous and Jurassic sands, kaolinitic clays and lignite) of the Moose River Basin (Figure 5).

The Superior Province is represented locally by the east-west striking Quetico and Opatica metasedimentary belts with the boundary between the 2 occurring at the Fraserdale-Moosonee tectonic block that is associated with the Kapuskasing Structural Zone. Granulite facies metasedimentary rocks of

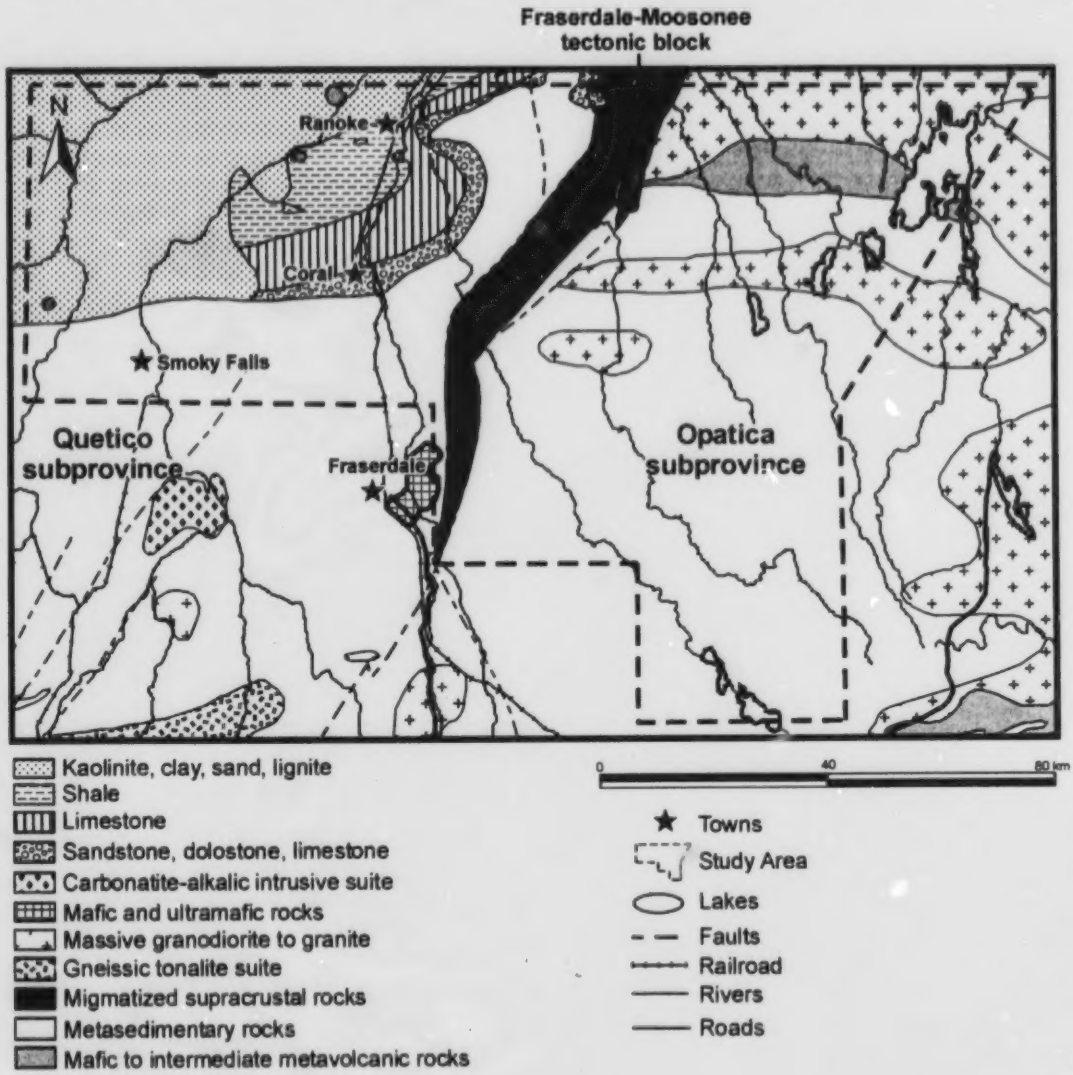


Figure 5. Bedrock geology of the Coral Rapids study area

the Quetico subprovince occur to the west of the Foxville and Kineras faults that define the westerly limit of the Fraserdale-Moosonee block. The easterly limit of the Fraserdale-Moosonee block is defined by the Bad River thrust fault. Metasedimentary paragneisses/migmatites and massive to foliated granodiorite/granitic plutons occur to the east of this fault in the Opatica subprovince. Only one greenstone belt is known to occur in the northwest part of the Coral Rapids study area (Opatica subprovince) in the vicinity of Kesagami Lake. The Kesagami Lake greenstone belt is for the most part covered by glacial drift and the extent of the belt has been delineated primarily by its geophysical expression.

It is generally accepted that the KSZ represents a region of uplifted Archean crust. The structural geology associated with the Kapuskasing uplift is complex and there are many different interpretations on the evolution of the Chapleau, Groundhog River and Fraserdale-Moosonee blocks. Percival and McGrath (1986) have suggested that the Fraserdale-Moosonee and Groundhog River blocks represent perched thrust tips of granulite facies archean crust whereas the larger Chapleau block represent a tilted slab. This interpretation is generally supported by the orientation of thrust faults, normal faults and geophysical data.

The timing of the Kapuskasing uplift is not clearly understood, however, detailed studies of deformation effects in early Proterozoic dike swarms suggest that it did not occur prior to the emplacement of the 2.04 Ga Kapuskasing dikes (Halls et al. 1994). The occurrence of non-deformed 1.8 Ga alkalic complexes in the Chapleau block (Sage 1991) suggests that the time of uplift can therefore be constrained to ca. 1.9 Ga (Percival and West 1994). For a detailed description of major lithologic features and a more comprehensive compilation of the geological evolution of the area, the reader is referred to Percival and West (1994).

A documentation of mineral occurrences within the Coral Rapids study area is well beyond the scope of this report. For further information on this topic the reader is referred to the numerous assessment files that are kept on record at the Mines and Minerals Library located in Sudbury and the Sault Ste. Marie and Timmins Resident Geologist's Offices.

Kimberlites North of the Study Area

Kimberlites of both Jurassic and Mesoproterozoic age occur approximately 250 to 300 km northeast of the study area in the vicinity of the Attawapiskat River, James Bay Lowland. The Attawapiskat kimberlite field contains the only known outcrops of kimberlite in the province (Sage 2000a).

The Jurassic age diatremes were discovered by Monopros during the 1980s. A detailed account of the discovery including a discussion on down ice indicator mineral dispersion patterns is given in Kong et al. (1999). By the early 1990s KWG Resources and their partner, Spider Resources, had identified diatremes of Proterozoic age approximately 100 km due west of the Jurassic cluster. The diamond bearing Kyle Lake No.1 kimberlite has been the most rigorously studied kimberlite from this group (Sage 2000a).

Melnoites in the Coral Rapids Study Area

Numerous mafic to ultramafic intrusions have been identified in the Coral Rapids study area. These rocks were discovered during a joint venture exploration program between Selco Mining Corporation and Esso Minerals Canada between 1979 and 1982 (Sage 2000a). A total of 14 anomalies classified as lamprophyres and ultramafic breccia have been identified in the vicinity of Coral Rapids (Figure 6). An additional 45 anomalies were also identified west of the study area in the vicinity of Hearst. The majority

of these were classified as tuffisitic breccia, with a few being classified as carbonatite and alnoite (Janse et al. 1989).

Sage (2000a) has used the term "pseudokimberlite" to describe these alkaline mafic-ultramafic intrusions. This term, which also includes carbonatites, is a somewhat crude descriptive term for rocks that may resemble kimberlite. Since carbonatites and members of the ultramafic lamprophyre group (alnoites and aillikites for example) are petrographically distinguishable, this expression is not used herein. In this report, the term "melnoite" has been adopted to describe these rocks. The use of this term was developed by the geology department of DeBeers Consolidated Mines Ltd. in order to help rationalise some of the terminological problems related to diamond exploration programs (Scott Smith 1995). The term "melnoite", which is devoid of petrographic connotations, can be used to describe rocks belonging to the lamprophyre facies, including but not restricted to ultramafic lamprophyres. The term is supported by Mitchell (Lakehead University, personal communication, 2000) and will be used herein to describe the tuffissitic breccias, alnoites and any other lamprophyre facies rocks that occur in the vicinity of the study area.

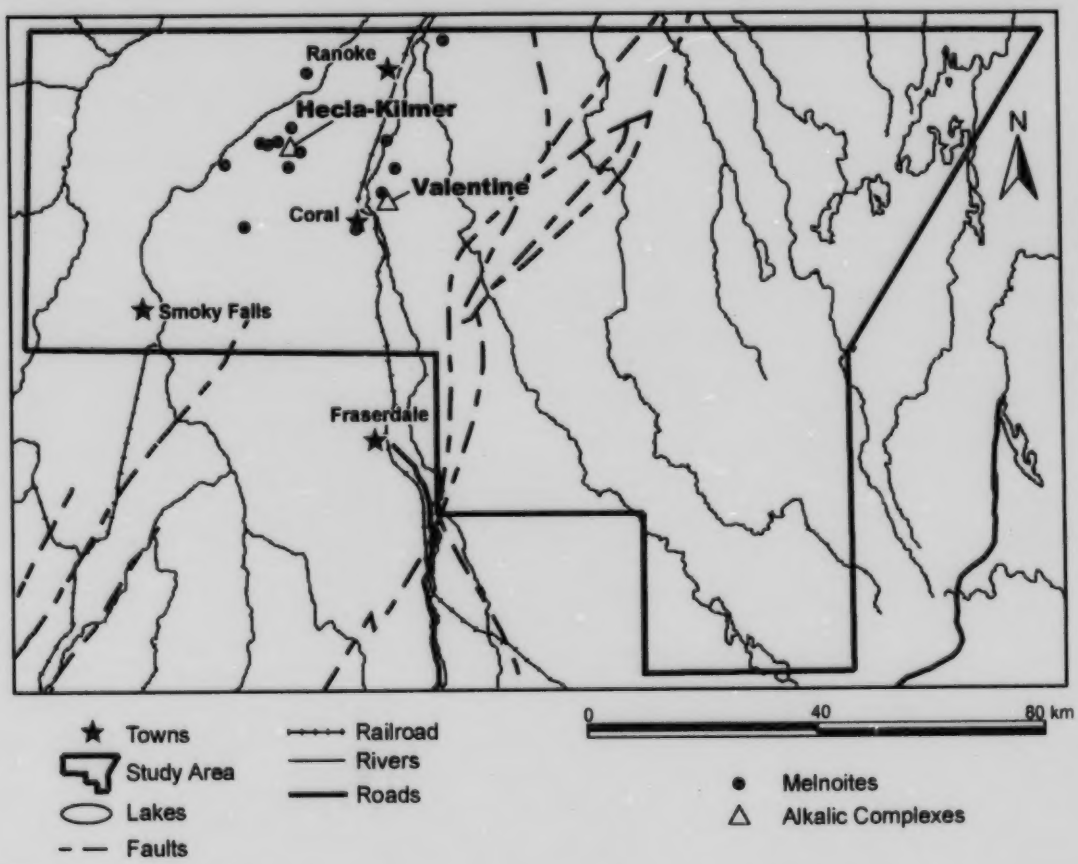


Figure 6. Location of alkalic complexes and known melnoites in the Coral Rapids study area..

There are a number of important factors to note concerning the melnoite occurrences in the vicinity of Coral Rapids. First, it is confirmation that this location is structurally favourable for the emplacement of deep-seated alkaline volcanic systems. It is not unreasonable to assume that archetypal kimberlite could also have been emplaced in this environment, although the work carried out by BP Selco would

suggest that the majority of geophysical anomalies are in fact melnoitic in character. A second factor to consider is that the melnoitic group of rocks are capable of transporting mantle xenoliths and the recovery of key KIMs in the secondary environment may be potentially misleading, particularly if the intended exploration target is kimberlite. However, a study of the Hearst melnoite cluster (Janse et. al 1989) suggests that mantle xenoliths are quite rare in these rocks and the vast majority of xenocrystal garnets, for example, are of crustal provenance. The interpretation of KIM anomalies should therefore be carried out with caution and regard for the proximity of sample sites to known melnoite locations is neccesary.

Alkalic Complexes in the Coral Rapids Study Area

There are 2 known alkalic complexes in the Coral Rapids study area. These include: 1) the Hecla-Kilmer alkalic complex; and 2) the Valentine Township carbonatite complex. The Hecla-Kilmer complex has been dated at approximately 450 Ma (early Paleozoic) using rubidium-strontium isotopic data. This is the youngest age obtained for any alkalic complex in the region. The precise age of the Valentine Township carbonatite is unknown, however, the interpretation of lithological data obtained from drill core would suggest that the complex may be of Mesoproterozoic age (Sage 1991).

The Hecla-Kilmer complex is located on the Hecla-Kilmer township divide on the east side of the Pike River, a tributary of the Mattagami River (Figure 6). The complex is covered with a thick blanket of muskeg, boulders, sand and clay and in some portions is overlain by a thin veneer of dark brown Devonian mudstone (Sage 1988a). The complex is comprised of olivine essexite, ijolite, pyroxenite and nepheline syenite and is not considered to contain any mineral phases of potential economic interest.

The Valentine Township carbonatite is characterised by 2 distinct geophysical expressions. The largest of these is located east of the Abitibi River at Coral Rapids. A smaller geophysical anomaly is situated on the west bank of the Abitibi River with the river flowing between these two magnetic highs as illustrated in Sage (1988b). Drilling performed by Argor Exploration Ltd. suggests that the complex is overlain by between 120 and 150 m of overburden and Paleozoic sedimentary rocks. The Paleozoic section consists of Devonian limestones and sandstones and ranges from about 70 to 100 m in thickness. The intrusion consists of magnetite-amphibole-biotite-phlogopite-apatite-olivine sovite and silicocarbonatite. Sage (1988b) reports that drilling at the site and subsequent assays returned widespread but sub-economic niobium and phosphorus mineralization.

Carbonatites are of economic interest since these complexes may be host to significant reserves of niobium in the form of pyrochlore mineralization. In addition to this, carbonatites also represent important sources of rare earth elements, thorium, iron, titanium, phosphorus and barium (Heinrich 1966). Carbonatites may also be host to economic reserves of copper as demonstrated at the Phalaborwa carbonatite complex in South Africa.

Kimberlite and Diamond Potential of the Study Area

To date, 2 areas within northeastern Ontario have been shown to host kimberlite. These areas are: 1) the Kirkland Lake-Cobalt area; and 2) the Attawapiskat and Missisa Lake regions in the James Bay Lowland. The results of exploration programs in the KSZ have also documented the occurrence of kimberlite in the Wawa region.

The focus on the KSZ began in 1993 when M. Clement (local prospector) reported the recovery of diamonds from the Michipicoten River. The OGS followed up this discovery with a modern alluvium

sampling program in the Michipicoten-Wawa area and the results of this work demonstrated the presence of numerous indicator minerals in the area including Ca-depleted G10 garnets and Cr-Mg rich inclusion field chromites (Morris et al. 1994). Subsequent modern alluvium sampling programs in the vicinity of both Wawa and the town of Kapuskasing (Morris et al. 1997a, Morris et al. 1998a, Morris et al. 1998b, and Stephenson et al. 1999) revealed similar results.

In addition to the recovery of these important indicator minerals, there are a number of geologic and geotectonic characteristics that make the area an attractive region for diamond exploration. First and foremost is the recognition that a correlation exists between diamondiferous kimberlites and stable Archean cratons where relatively cool and highly refractory lithospheric mantle roots have been preserved in the sub-cratonic environment (Helmstaedt and Gurney 1995). Preservation of these roots (and the diamonds therein) requires that these structures remain insulated against excessive re-heating and subsequent plate motions. The results of seismic tomography (Grand 1987), although speculative, suggest that the lithospheric regions beneath the Superior and Slave Archean provinces are characterised by relatively fast shear wave velocities and as such constitute areas below which thick lithospheric mantle roots are preserved.

It is difficult to predict whether the Proterozoic event that thrust Archean basement from the Wawa subprovince onto the Abitibi subprovince would be beneficial or detrimental to the preservation of an ancient lithospheric root in the vicinity of the KSZ. However, the recovery of numerous Ca-depleted garnets from alluvium sampling within the KSZ strongly suggests that if these grains are locally derived, then highly refractory depleted mantle either exists or existed below this region and was sampled by a magma that tapped this root zone.

It is interesting to note that the highly depleted compositions ($CaO < 2$ wt% and $Cr_2O_3 > 6$ wt%) observed in some of the KSZ G-10 alluvial garnets from previous OGS projects are not observed in garnet xenocryst populations isolated from numerous Kirkland Lake-Cobalt (Sage 1996, Sage 2000b) and Attawapiskat diatremes (Sage 2000a). An exception to this is the Proterozoic diamondiferous intrusion at Kyle Lake, James Bay Lowland.

This is an important point to emphasise since it negates the possibility that the Ca-depleted alluvial garnets recovered from previous OGS projects were transported down ice from the vicinity of the Attawapiskat River. Only the Kyle Lake No.1 pipe contains garnets of similar composition. However, since this pipe is Proterozoic in age it did not therefore intrude the Paleozoic rocks covering the region. Glacial transport of the indicator minerals from this location could, therefore, not occur. Furthermore, the indicator mineral dispersion plume from the Attawapiskat cluster as described by Kong et al. (1999) is not proximal to the Coral Rapids study area.

Considering the above points, the kimberlite and diamond potential of the study area can be summarised as follows:

1) the study area is situated in a stable Archean cratonic environment where the preservation of a depleted lithospheric root is likely;
2) recovery of Ca-depleted G10 alluvial garnets and inclusion field chromites in the vicinity of the KSZ suggests that a diamond facies depleted mantle root was sampled at some point in time by kimberlitic or related magmas;
3) the discovery of diamond bearing Archean ultramafic dikes in the Wawa area suggests that the diamond facies lithospheric mantle was at the least, sampled during Archean times;
4) the absence of G10 garnets and inclusion field chromites from these same altered ultramafic dikes suggests a different source for those minerals recovered during alluvial sampling programs.

Glacial Geology

The Quaternary geology of the Coral Rapids study area records a very dynamic and rapidly changing sequence of events related to the deglaciation of northeastern Ontario. The retreat of the Laurentide ice sheet through the study area can be somewhat crudely summarised as follows. The deglaciation is recorded in Holocene sediments starting some 9000 years ago when the ice margin was located just south of the study area. By about 8400 years ago the ice margin had receded to a position that is defined by the glaciofluvial ice-contact deposits of the Pinard Moraine. The area to the south of the Pinard Moraine was occupied by glacial lake Barlow-Ojibway where the sediments deposited in this lake are recorded in the fine-grained glaciolacustrine deposits. Following this period there were local re-advances or surges of ice throughout the study area. These surges are known as the Cochrane readvance and are recorded in the fine grained tills that overlay the glaciolucustrine deposits of lake Barlow-Ojibway. It is generally believed that there were 2 main ice surges related to the Cochrane readvance with the age of the last readvance thought to have taken place by about 8275 years ago (Dredge and Cowan 1989).

Following this period the ice margin rapidly retreated from the study area and the Tyrell Sea invaded the James Bay Lowland by about 7800 to 8000 years ago (Dredge and Cowan 1989). The limit of the Tyrell Sea incursion is defined by the present day extent of low-lying organic deposits in the northwest part of the study area. Prest (1970) identified beach ridges associated with the maximum extent of the Tyrell sea in the vicinity of the Mattagami and Abitibi rivers.

Surficial mapping in the southern part of the study area has been completed at a regional scale (1:506 880) by Boissonneau (1965). More recently, the surficial geology for the area has been compiled at a scale of 1: 1 200 000 by Sado and Carswell (1987) and at a scale of 1:1 000 000 by Barnett et al. (1991). It is difficult to assess the direction of older versus younger ice movements in the area since detailed Quaternary mapping coverage of the area is limited. However, evidence from linear ice flow indicators (Figure 7) such as glacial striae, drumlins and crag and tail forms suggest that the last ice movement in the area was generally south to southwest in the west part of the study area and south to southeast in the east part of the study area (Boissonneau 1965; Sado and Carswell 1987 and Prest 1970).

Material Sampling

For this study, modern alluvium was chosen as the primary sampling media as it provides a means of gaining a fast, relatively inexpensive heavy mineral signature for individual drainage basins. The heavy mineral signature obtained from modern alluvium is a product of the erosion of both bedrock and overburden, and the subsequent transportation and deposition of the eroded material. A more detailed discussion of the controls on these processes can be found in Morris and Kaszycki (1997) and Morris et al. (1994).

A private vendor under contract to the Ontario Geological Survey (OGS) carried out the field work and sampling for this survey. Standard OGS sampling methodologies were utilised (see Morris and Kaszycki 1997) and OGS staff monitored adherence to these protocols. The samples were processed by Overburden Drilling Management of Nepean, Ontario. All microprobe work on the picked indicator mineral fractions was carried out at the Ontario Geoscience Laboratories in Sudbury, Ontario.

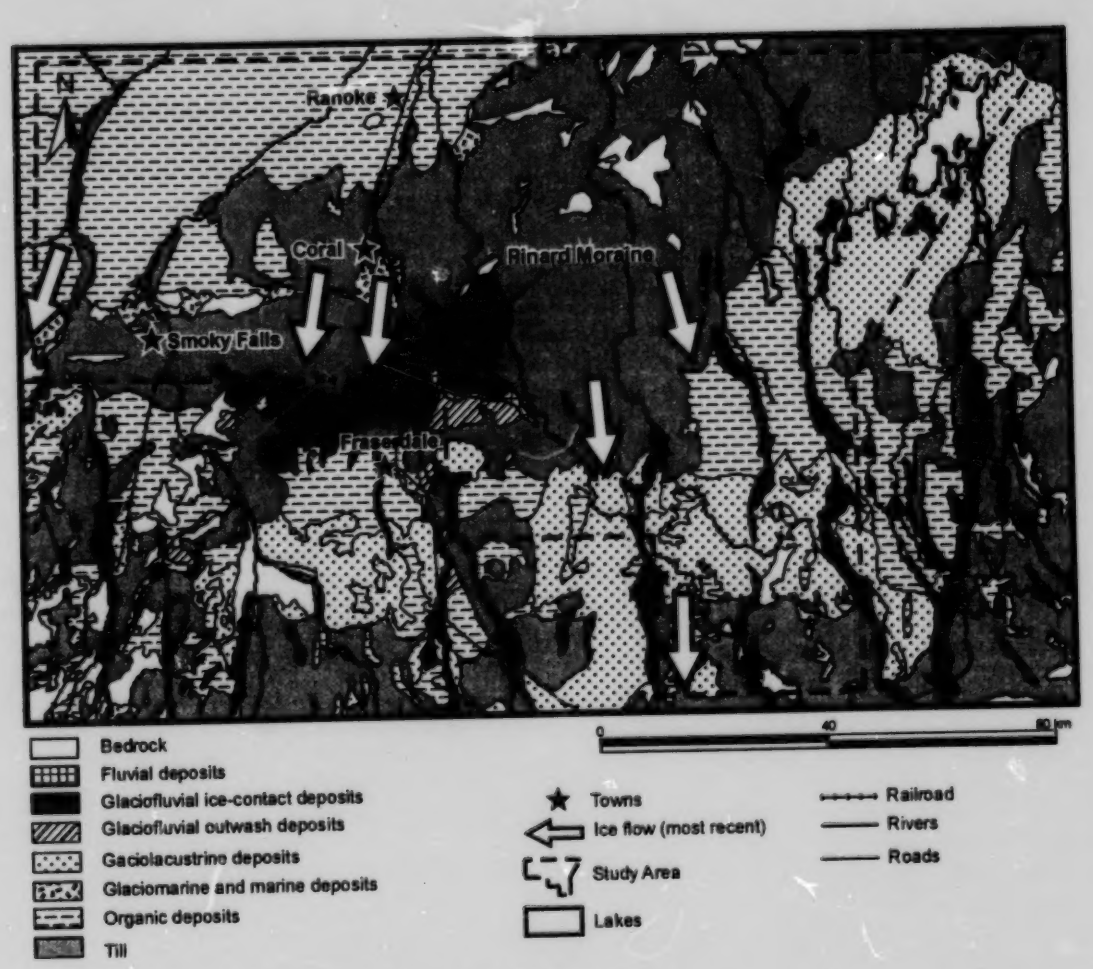


Figure 7. Quaternary geology of the Coral Rapids study area.

Heavy Mineral Recovery and Identification

A total of 354 samples collected from the Coral Rapids study area were submitted for heavy mineral concentrate analysis. Samples were processed for gold grain, KIM and MMSIM® content as shown in Figure 8.

In the lab, the 10 to 18 kg field samples were disaggregated (if needed) and sieved to remove the +10 mesh (+2 mm) size fraction. The entire –10 mesh size fraction was then passed across a shaker table twice to produce a rough heavy mineral concentrate. Samples in which a pre-determined number of gold grains were seen during shaker table processing had the heavy mineral (table) concentrate refined by hand or mechanical panning to concentrate all contained gold grains and associated pathfinder minerals. Following panning (if required), the tabled heavy mineral separates underwent a heavy liquid separation. The specific gravity of the heavy liquid used during this procedure is 3.2. Following heavy liquid separation the >3.2 S.G. magnetic minerals were separated using an auto-magnet. The paramagnetic

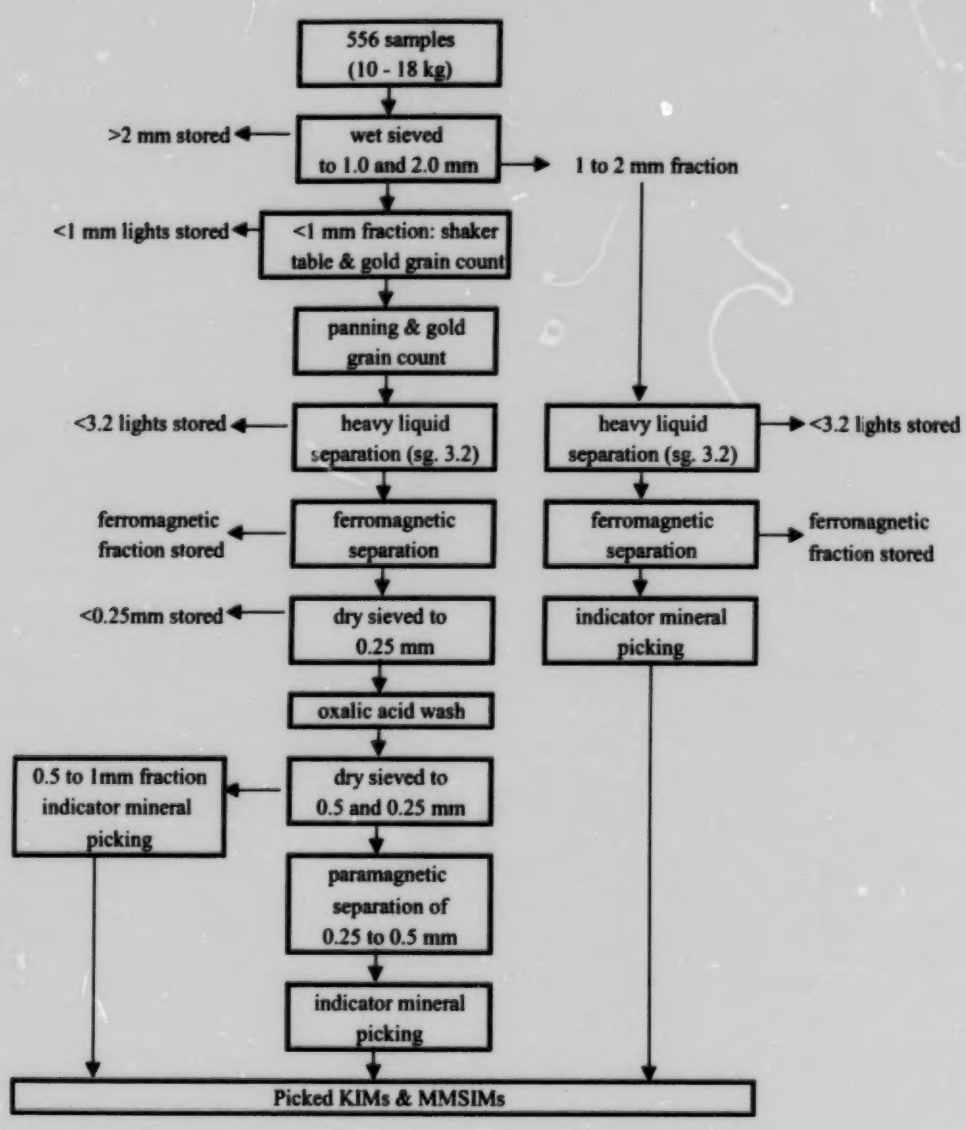


Figure 8: Heavy mineral sample processing flow chart (Modified from Averill 1998).

fractions (weakly, moderately, strongly) and non-paramagnetic fractions were isolated using appropriate methodology. The final heavy mineral concentrate (HMC) was sieved to obtain 4 size fractions (<0.25, 0.25 to 0.5, 0.5 to 1.0 and 1.0 to 2.0 mm), each of which were weighed and placed in vials. Indicator mineral picking was then performed on the 0.25 to 0.5, 0.5 to 1.0 and 1.0 to 2.0 mm size fractions (Appendix B). A scanning electron microscope was used to confirm/check any questionable picked grains and to determine the geochemistry of the grains. Microprobe analysis was then performed on all of the picked kimberlite indicator mineral grains to determine grain chemistry.

Data Plotting Parameters

The proportional dot diagrams in this report illustrate the relative abundance of indicator minerals and their locations throughout the study area. Percentiles were only calculated for statistically representative populations of indicator minerals. When relatively few indicator minerals occur the data is plotted on the proportional dot diagram using arbitrary divisions between grain numbers. This can be justified since under these circumstances all grains are anomalous (exceed the 95th percentile).

Tables and appendices for this study area are presented as raw data with normalisation only carried out where picked vs. estimated grain counts apply. The normalised data was used (when applicable) on the proportional dot maps presented herein. This differs from previous reports (Ontario Geological Survey 2001a, 2001b) which report data as both raw and normalised to table weight feed in the appendices. Normalised data was only used on proportional dot maps for the Kapuskasing study area (Ontario Geological Survey 2001a), whereas, raw data was used on proportional dot maps from the Chapleau study area (Ontario Geological Survey 2001b) on the grounds that there wasn't a substantial difference between raw and normalised data sets.

Data for the Coral Rapids study area are not normalised to table weight feed for the following reasons. First, normalising the data to table weight feed does not in any way compensate for the fact that individual sample sites may have very different particle size distributions. Since KIMs and MMSIMs® tend to be concentrated in the 0.25 to 0.5 mm size fraction, it follows that any form of normalisation should take into consideration sample to sample differences on the basis of critical particle size fractions and not table weight feed. However, even such a correction of raw data cannot account for the fact that some sample sites may have undergone a placer effect whereby certain indicator minerals may have been preferentially concentrated. Normalisation is therefore not recommended, except for unusual circumstances where abnormally high numbers of indicator minerals were present and only a select number of grains were picked from an estimated total number of grains (see Appendix C).

It should also be noted that a degree of caution should be exercised when observing anomalous sites on the proportional dot diagrams since samples collected in all study areas were variable in texture. As previously mentioned, the sand size fraction is the most favourable for KIM recovery and samples containing large amounts of finer material do not normally contain many KIMs. However, these samples were included in the calculation of percentiles for determining anomalous values of KIMs in this study. The addition of these samples may have resulted in false anomalies. It is therefore important to place emphasis on a site or cluster of sites that have numerous KIMs and a variety thereof.

Kimberlite Indicator Minerals

Probably the most widely used technique at the early stages of diamond exploration programs is heavy mineral sampling (Fipke et al. 1995). This technique is designed to isolate a unique group of minerals formed at extremely high pressures in an environment that may host diamond. Since these minerals are far more abundant than coexisting diamonds in the mantle environment, exploration programs focus on the recovery of indicator minerals rather than diamonds for obvious practical reasons. Fortunately, the key indicator minerals are resistant to weathering and survive extremely well in the secondary environment, even in highly weathered terrains.

The most important indicator minerals are garnet, chromite, ilmenite and to a lesser extent chrome diopside. Olivine may also be an important indicator mineral in immature post-glacial weathering environments such as those found in northern Canadian climates.

The Mantle Sample

It is very important to recognise that kimberlitic magmas and diamonds are petrogenetically unrelated. Kimberlite magmatism represents one of only 2 known types of transportation mechanisms (the other being lamproite) capable of delivering economically viable diamond deposits to the earth's surface. These magmas must form at extreme depths (in excess of 150 km) in order to tap the diamondiferous portions of the sub-cratonic lithosphere.

Diamonds therefore represent foreign xenocrysts that are sampled in the earth's upper mantle and transported and erupted within the kimberlitic magma. Extensive studies of both mineral inclusions within diamonds and diamondiferous xenoliths have revealed 2 major modes of occurrence. These include peridotitic and eclogitic paragenesis (Gurney 1984). The transportation and subsequent disaggregation of these xenoliths during the eruption process is the mechanism by which both the diamonds and associated indicator minerals become liberated from their mantle host rocks.

The recognition that peridotitic diamonds are more common than their eclogitic counterparts at most mine sites (Orapa, Botswana and Argyle, Australia are notable exceptions) provides the reasoning for why the major focus of indicator mineral surveys is on the recovery of the Cr-rich minerals typical of peridotite xenoliths (Gurney 1984). The minerals of particular interest include Cr-pyrope garnet, chromite and Cr-diopside. These minerals coexist with olivine and orthopyroxene in the peridotite assemblage and the variation in modal proportions of clinopyroxene, orthopyroxene and olivine provide the basis for classifying peridotite xenoliths (harzburgite, lherzolite and websterite for example). The 2 most important types of diamond bearing peridotites include harzburgite and lherzolite.

The recovery of eclogitic garnets in alluvial sampling programs is important, but these minerals tend to be less abundant than their peridotitic counterparts and are more difficult to distinguish from garnets of shallower crustal origin due to similarities in colour. Focus on the recovery of eclogitic garnets can therefore increase the cost of an exploration program since electron microprobe analysis will be required for all garnets that share this similar physical characteristic.

Geochemical Characteristics of Important Kimberlite Indicator Minerals

Garnet

Garnets found in kimberlites can be classified as belonging to 2 major groups. These include the megacryst group (or discrete nodule suite) and foreign xenocrysts. The origin of the megacryst or discrete nodule suite is debatable and remains one of the major unresolved problems of kimberlite petrology. However, most mantle petrologists appear to favour a cognate (phenocrystal) high pressure origin over a xenocrystic origin. Regardless of their origin, the megacryst garnets have distinctive

compositions (elevated Ti and low to moderate Cr contents) and recovery of these minerals is regarded as a definitive indicator of kimberlite magmatism (Mitchell 1986).

By far the most important garnets associated with kimberlite magmatism are the Cr-rich xenocryst group. These foreign xenocrysts are pieces of dissagregated peridotite xenoliths that have been entrained and brought to surface in the kimberlite magma. They are visually and chemically distinctive having a unique bright purple through lilac colour and a distinctive Cr-rich pyrope composition. These Cr-pyrope garnets are not only useful as kimberlite indicator minerals, but more importantly, as diamond indicator minerals.

Studies of mineral inclusions within diamond (see Gurney 1984 for a review) revealed that the majority (> 85%) of peridotitic garnet inclusions have Ca-poor compositions typical of garnets found in harzburgites. As such, garnet harzburgites are far more important source rocks for diamonds than garnet lherzolites. This is extremely important since it would suggest that the recovery of significant numbers of harzburgitic (Ca-poor) Cr-pyropes from alluvium sampling programs can be used to forecast the diamond potential of a prospective area.

Statistical classification of garnets from kimberlites and associated xenoliths (Dawson and Stephens 1975) demonstrated the existence of 12 separate clusters or groups of compositions based on discrete geochemical parameters. The Group 10 garnets (G10) were represented by the majority of diamond inclusion garnets and some other xenolith garnets, although the authors failed to provide a definitive link between these compositions and a harzburgite host. Similarly, the Group 9 garnets (G9) were found to represent the majority of lherzolitic garnet compositions. Exploration geologists now commonly use these terms in a very general sense to identify peridotite garnets that originated from lherzolite (G9) and harzburgite (G10).

The majority of economic diamond bearing diatremes have comparatively large populations of G10 garnets relative to those that are either barren or contain low diamond grades (Gurney 1984, Gurney and Zweistra 1995). Exceptions to this rule include the appropriately named Zero kimberlite pipe in South Africa that is barren yet contains numerous G10 garnets, and the highly productive Argyle lamproite that contains no G10 garnets. The Argyle deposit is dominated by diamonds of eclogitic paragenesis and the recovery of G9 and G10 garnets would therefore be expected to be minimal. However, if the global population of kimberlites and lamproites are taken into consideration, a plethora of examples from numerous continents support the notion that the recovery of statistically representative populations of G10 garnets in alluvial sampling programs is indicative of high potential for diamond recovery.

The eclogitic Cr-poor garnets from diamondiferous eclogites are reported to have compositions that are distinguishable from barren eclogites according to McCandless and Gurney (1989). This study shows a link between elevated Na concentrations in garnets from diamond bearing type I eclogite xenoliths (Na_2O > 0.07 wt%) and those with Na depleted compostions in the barren type II eclogite xenoliths (Na_2O < 0.07 wt%). The inference here is that the recovery of type I compositions in exploration programs can be as important as the recovery of G10 garnets. However, Grutter and Quadling (1999) provide data that suggests that this approach is far less rigorous than previously believed and potentially misleading. Their data suggests that a threshold of 0.07 wt % Na_2O does not effectively discriminate between graphite and diamond bearing eclogite xenoliths. Furthermore, Shulze (1999) has emphasised the point that diamondiferous kimberlites with high populations of eclogitic diamonds do not necessarily have large populations of accompanying eclogitic garnet xenocrysts. As such, emphasis on the recovery of type I eclogitic garnet xenocrysts should not be emphasized until the late stages of exploration programs.

Garnets recovered from modern alluvium sampling in this study were classified on the basis of a combination of chemical parameters that utilise thresholds for concentrations of Cr_2O_3, TiO_2, Na_2O, FeO, CaO and MnO. The isolation of garnets from peridotites is fairly straight-forward as these minerals

typically display elevated concentrations of Cr_2O_3 (> 2 wt %), and can be further subdivided into G9 and G10 classifications on the basis of CaO concentrations. The only exception to this rule is the crustal uvarovite garnets that have very high Cr_2O_3 concentrations but also exhibit elevated CaO concentrations and are easily distinguished on the CaO vs Cr_2O_3 garnet plot. The megacryst garnets typically exhibit Cr_2O_3 concentrations that range from 0 to 4 wt % and are enriched in TiO_2 relative to peridotite garnets. Although compositional overlap does exist between the megacryst and lherzolitic (G9) pyrope garnets, both have equal value in exploration programs since they are indicative of mantle sampling and are therefore useful kimberlite indicator minerals.

Distinguishing the eclogitic garnets from the remainder of crustal compositions is more tedious. Fortunately, Shultze (1999) provided a useful set of guidelines for isolating eclogitic garnets from crustal garnets and Cr-poor megacryst garnets. The most important step in this process is to screen out crustal garnets on the basis of FeO concentration. A value of 21 wt% FeO is the suggested threshold and minerals with FeO concentrations greater that this are not considered to be of eclogitic paragenesis. The reader should be aware that many crustal garnets display FeO < 21 wt%, but these minerals contain either elevated spessartine or grossular components and can therefore be screened on the basis of MnO (typically > 1%) and CaO (typically > 15 wt%). After the eclogitic garnets have been isolated, the classification of group I and group II eclogites and compositional overlap with megacryst garnets can be solved with a reasonable degree of success using a plot of Na_2O vs TiO_2 (Fipke et al. 1995).

A total of 143 mantle derived garnet grains were recovered from the Coral Rapids study area including: 7 G10 garnets; 124 G9 garnets; 5 megacryst garnets; and 7 eclogitic garnets. Figure 9a shows the distribution of data on the lherzolite/harzburgite discriminant plot including the individual sample sites associated with the G10 garnet population. The compositions of the megacrystic and eclogitic garnets are shown on Figure 9b. Mantle derived garnets do occur throughout the study area (Figure 10) although the most significant anomalies are found within the Moose River Basin. G10 garnets occur both within the basin and also south of the basin in the Quetico subprovice as well as to the east in the Opatica sub-province. The most significant garnet anomalies occur along the Mowbray Creek /Opasatika River / Missinaibi River system, with important sample sites including the following: KAP-1910 (3 G9s); KAP-1964 (4 G9s); KAP-1965 (5 G9s); KAP-1968 (3 G9s); KAP-1916 (1 G10 and 1 megacrystic); KAP-1969 (6 G9s, 1 megacrystic and 1 eclogitic); KAP-1980 (3 G9s); KAP-1983 (3 G9s); KAP-1984 (1 G10). The composition of the G10 garnet at site KAP-1916 is important since it represents an extremely Cr-rich and Ca-depleted variety. Other important areas include the Onakawana/Abitibi River systems with important sample sites occurring at: KAP-2121 (3 G9s); KAP-2181 (3 G9s); KAP-2176 (1 G10). Other important single sites with garnet counts in excess of the 99th percentile or G10 garnets include: KAP-2169 (3 G9s)/Little Abitibi River; KAP-2302 (3 G9s)/Bad River; KAP- 2252 (3 G9s)/North French River; KAP-2149 (1 G10 and 1 G9)/North French River; KAP-2272 (1 G10)/Wakwayowkastic River south; and KAP-2209 (1 G10)/ Wakwayowkastic River north.

Summary statistics and mineral chemistry for all garnet grains are listed in Appendix C and MRD 87 (Appendix D, Ontario Geological Survey 2001d).

Chromite

Studies of mineral inclusions in diamond have revealed that chromites have distinct compositional characteristics that can be used in exploration programs to gauge the probability that diamond facies mantle rock has been sampled. This distinction is made on the basis of MgO vs. Cr_2O_3 discriminant plots. Fipke et al. (1995) identified 2 clusters of chromites corresponding to diamond inclusion and diamond intergrowth compositional fields. Both of these fields display elevated concentrations of MgO and Cr_2O_3, and the recovery of chromites with these compositional characteristics is considered important with respect to predicting whether diamonds are likely to accompany the recovered indicator minerals.

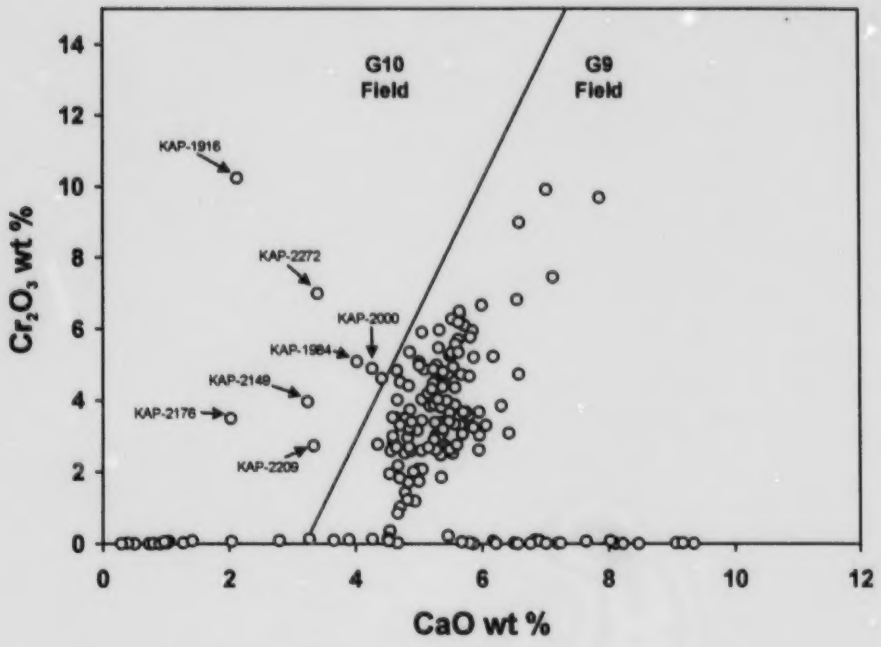


Figure 9a. CaO vs. Cr_2O_3 garnet discriminant plot

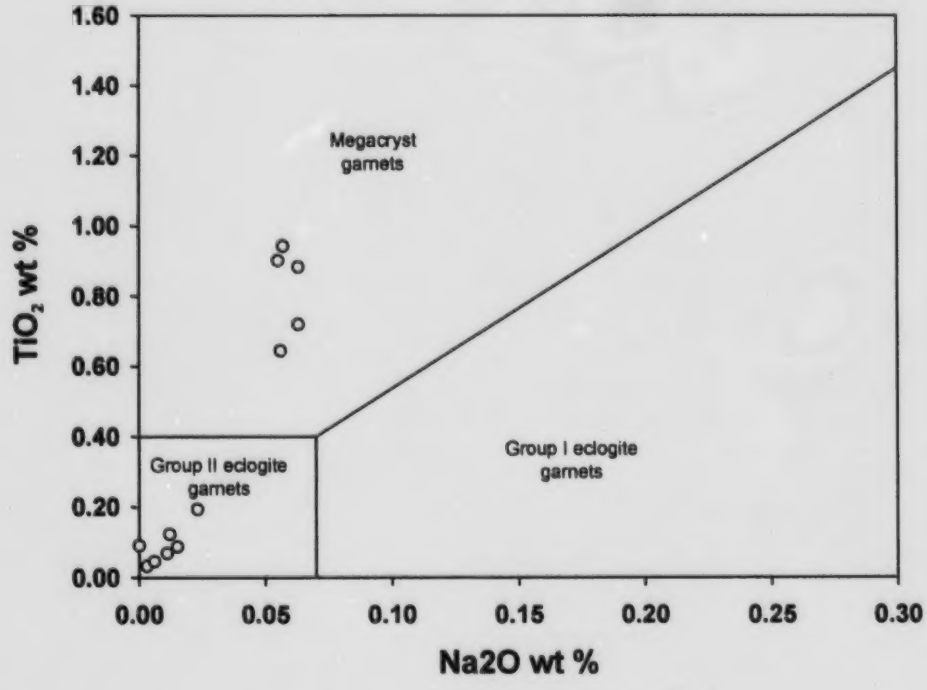


Figure 9b. Na_2O vs. TiO_2 garnet discriminant plot

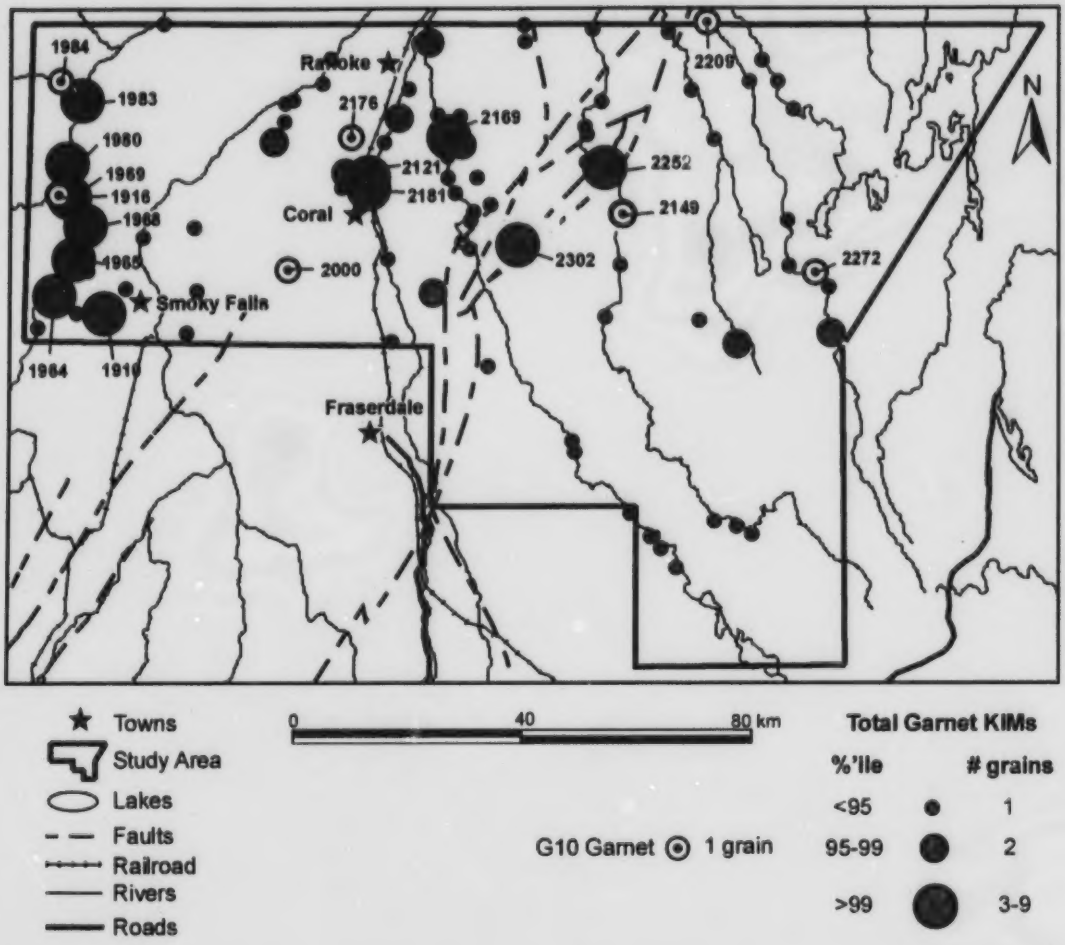


Figure 10. Regional distribution of garnet KIMs in the Coral Rapids study area.

Gurney and Zweistra (1995) suggest that after G10 garnets the "diamond inclusion field" chromites are the next most important indicator mineral.

This may be so, but the real challenge for exploration geologists is to try to classify chromites that do not fall into the diamond inclusion or intergrowth fields. Unlike the garnet peridotite indicator mineral suite, kimberlitic chromites have significant major element compositional overlaps with chromites from other sources. In addition, chromite differs from garnet in that it precipitates as an early forming liquidus phase in most mafic and ultramafic magmas and can be an extremely common heavy mineral component in secondary environment sediments. Fipke et al. (1995) proposed that the TiO_2 and Cr_2O_3 concentrations of chromites can be used to isolate kimberlitic and lamproitic chromites from other sources. This approach is a welcome tool since the Ti-rich lower pressure magmatic chromites can be isolated and used as bona fide KIMs in the exploration data set. Unfortunately, the largest population of chromites recovered during modern alluvium surveys is characterised by Ti-poor compositions (likely from a combination of crustal and mantle sources) and these fall in the field of compositional overlap with other sources.

Examination of a large electron microprobe data base for chromite xenocrysts isolated from numerous diatremes in the Lake Timiskaming Structural Zone (LTSZ) and Attawapiskat areas of Ontario (Sage 1996, 2000a, 2000b) suggests that the overlap field reported by Fipke et al. (1995) can be modified to exclude most of the Cr_2O_3 poor and TiO_2 rich compositions (Figure 11). This is because the overwhelming majority of kimberlitic chromite analyses plot along an arc that trends from moderate Cr_2O_3 and depleted TiO_2 compositions through to high Cr_2O_3 and TiO_2 compositions in the field unique to kimberlite and lamproite and only intersects a minor portion of the overlap field. The implication here is that data which plots in the field of compositional overlap should not be included in the KIM data set unless other parameters such as trace element data or textural characteristics can be used to further isolate kimberlitic compositions. Multivariant statistical approaches have been used elsewhere to aid in filtering out non-kimberlitic chromites from the exploration database (Griffin et al. 1997), but this requires access to a large data base of chromites from kimberlites and other sources. In this study, only data that plots in the field unique to kimberlite and lamproite are classified as KIMs.

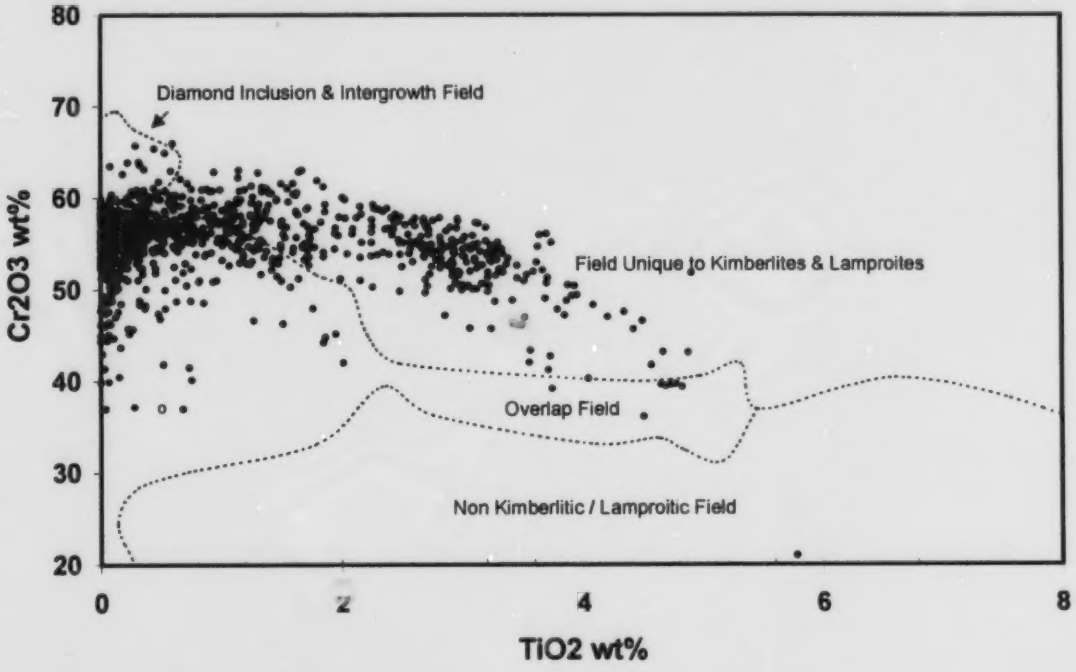


Figure 11. TiO_2 vs. Cr_2O_3 plot for 2200 chromite xenocrysts isolated from Ontario kimberlites

A total of 4569 chromites were analysed by electron microprobe from the Coral Rapids study area. Figure 12a shows the distribution of these data on a MgO vs Cr_2O_3 plot. Figure 12b illustrates the distribution of the data on the Fipke et al. (1995) TiO_2 vs Cr_2O_3 binary plot. There are a total of 106 analyses from numerous sample sites that either plot in the field unique to kimberlite and lamproite or have other chemical parameters such as elevated Cr and Mg concentrations that warrant a KIM classification. This total increases to 621 KIMs if the data are normalised based on picked versus estimated grain counts for individual samples. The regional distribution of these KIM chromites based on normalised data is shown on the proportional dot map (Figure 13). The sites with the most anomalous concentrations of chromite KIMs (> 99th percentile) are as follows: KAP-1979; KAP-1999; KAP-2122; and KAP-2267. There are numerous sites with chromite KIMs in the 95th to 99th percentile class (Figure 13) with the majority of these occurring outside the basin in the eastern part of the study area.

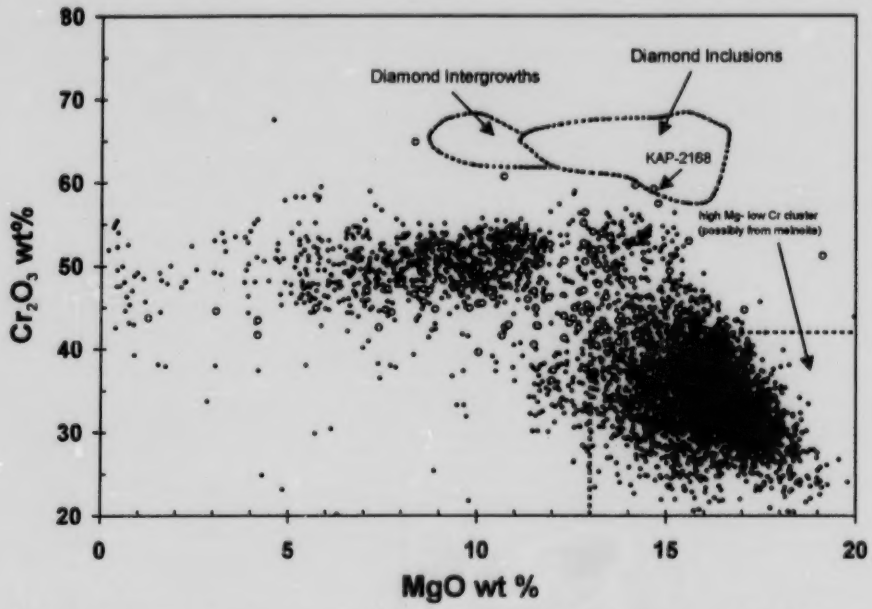


Figure 12a. MgO vs. Cr2O3 plot for chromites recovered from the Coral Rapids study area. The field identified as "possibly" melnoitic is speculative and based on limited published data. The boundaries used to define this field are arbitrary and not intended to be used as a definitive tool. Symbols are as follows: open circles, KIM chromites; filled circles, other chromites.

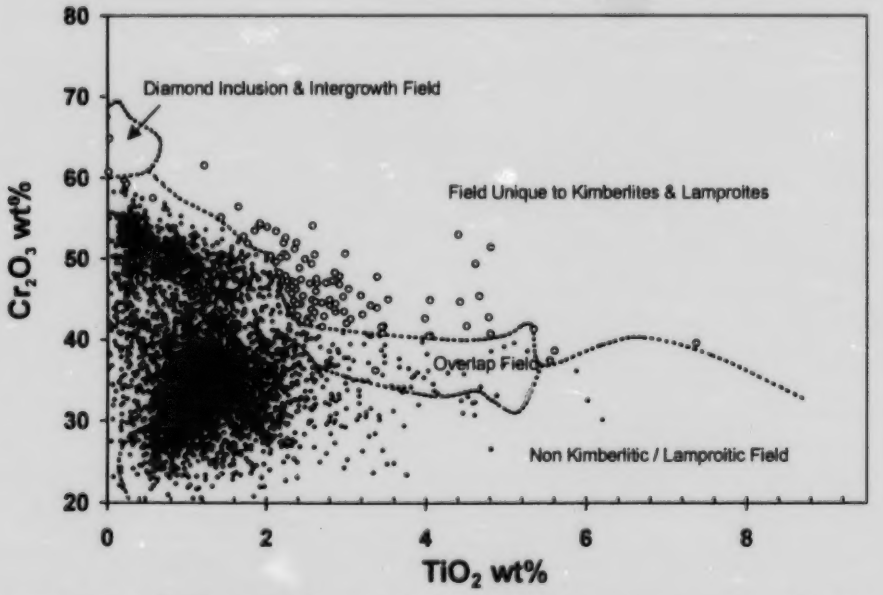


Figure 12b. TiO_2 vs. Cr_2O_3 chromite discriminant plot (Fipke et al. 1995) for chromites recovered from the Coral Rapids area. Symbols are the same as for Figure 12a.

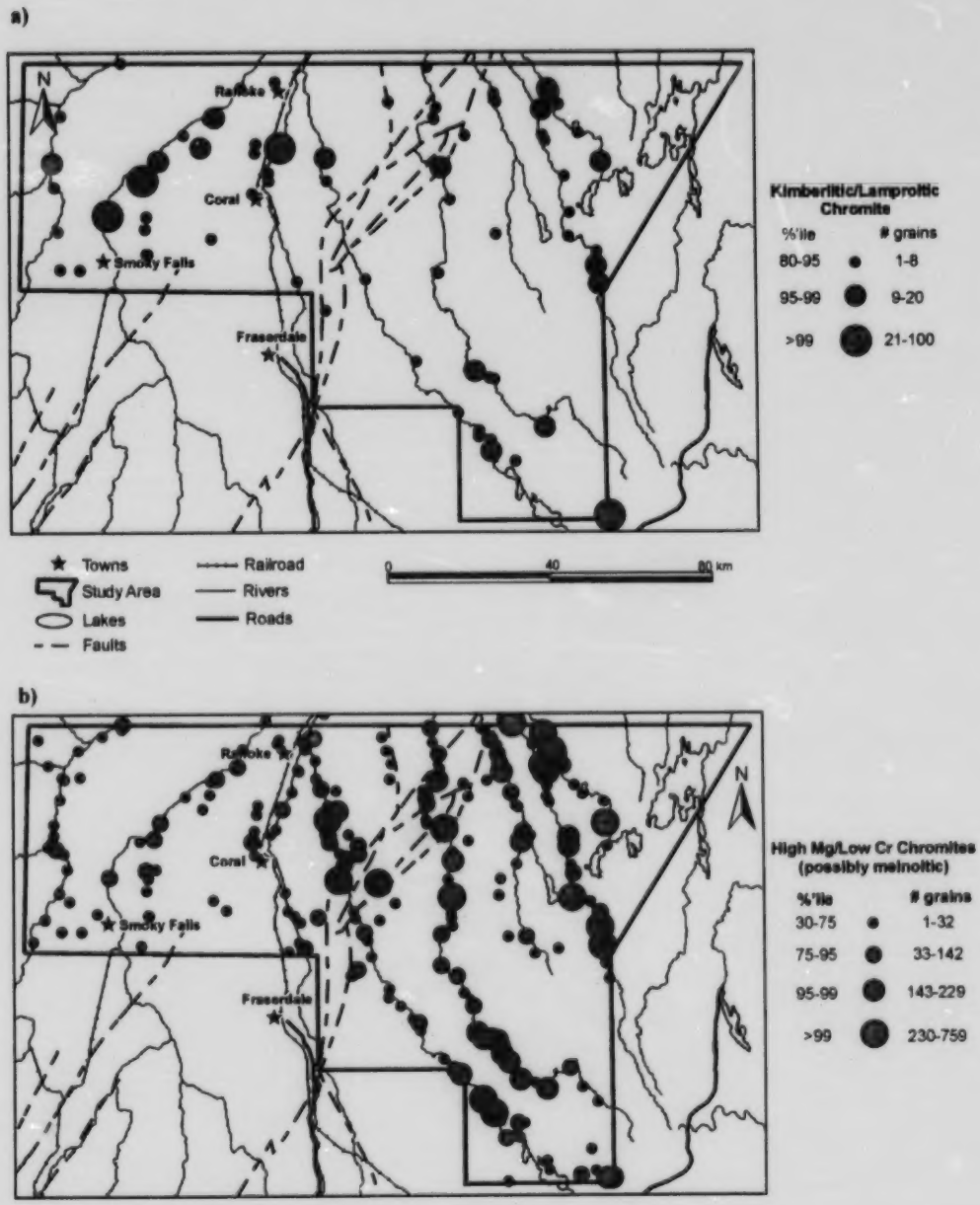


Figure 13. Regional Distribution of chromites in the Coral Rapids study area. Figure 13a represents the distribution of chromite KIMs. Figure 13b represents the high Mg/low Cr chromite cluster.

The reader needs to be aware that a somewhat unique compositional cluster of chromites occurs in the Coral Rapids study area. This data cluster which consists of 3100 probe analyses (15 320 if normalised) is identified in Figure 12a by high MgO (>13wt%) and low Cr_2O_3 (<42 wt%) concentrations

and has compositional similarities to chromites from the Sextant Rapids I5-10 melnoite (Sage 2000a) and other melnoites (Fipke et al. 1995). Similar compositions are also observed in other basic volcanics and layered ultramafic complexes (Fipke et al. 1995) and the cluster is therefore referred to as "possibly" melnoitic. The presence of known melnoites in the study area (Figure 6) suggests that this may be a reasonable assumption. It interesting to note, however, that the majority of anomalous compositions from this class occur outside the Moose River Basin in an area where melnoites have not yet been identified. This would appear to indicate that either melnoites do exist in the Opatica subprovince or the assumption that this compositional cluster is in any way related to melnoitic rocks is incorrect.

Summary statistics and mineral chemistry for all chromite grains are listed in Appendix C and MRD 87 (Appendix D, Ontario Geological Survey 2001d).

Mg-Ilmenite

Magnesian ilmenite occurs as a megacryst phase in type I kimberlites (Gurney and Zweistra 1995). Since ilmenite is rare as both an inclusion within diamond and as a component of mantle xenoliths, no genetic link can be made between ilmenites and diamonds. As such, much of the literature on the topic tends to place less importance on the recovery of ilmenite grains, relative to garnet or chromite, in alluvial sampling programs. This is perhaps an unfair assessment since compositional overlap with crustal sources is far less problematic than with, for example, chromites. Furthermore, the recovery of ilmenites in stream samples has proven to be the key factor in locating the distal (approximately 350 km) down-ice dispersion plume of the Attawapiskat kimberlite field (Kong et al. 1999). The study by Kong et al. (1999) demonstrated that the evaluation of diamond grades of prospective kimberlite occurrences based on garnet and chromite geochemistry is perhaps not always important during the early stages of exploration.

The characteristic composition of megacrystic ilmenite from kimberlites is their generally high MgO content (4 to 16 wt%) and Cr_2O_3 concentrations that range from 0.1 to 11.0 wt% (Mitchell 1986). Ilmenites with MgO values of less that 4 wt% are reported from the Iron Mountain kimberlite in the Colorado-Wyoming kimberlite province (McCallum and Vos 1993), but in general the vast majority of global megacryst occurences can be isolated using a MgO threshold of 4 wt%.

Since the incorporation of the Fe_2O_3 molecule into the ilmenite structure is dependent on the oxygen fugacity (fO_2) in the kimberlitic magma (Hagerty and Tompkins 1983), it has been suggested that ilmenite compositions may be used to predict whether magmatic conditions would have been favourable (reducing) or detrimental (oxidizing) for diamond preservation during kimberlite emplacement. Highly oxidizing conditions are known to promote diamond resorption and studies of a number of kimberlite occurrences (Gurney and Zweistra 1995) show a possible link between stoichiometric Fe_2O_3 concentration and diamond grade. However, the authors note that the technique is qualitative and as such, poorly constrained. Furthermore, there are important examples where the technique does not properly forecast the diamond grade (Mir kimberlite, Siberia) and the use of this technique is not necessary or logical during the early stages of exploration.

Ilmenite compositions are normally projected on an MgO vs. Cr_2O_3 plot in order to screen out compositions that are from crustal sources (MgO < 4 wt%). Exceptions to this rule may be required if Cr_2O_3 rich ilmenites are observed with MgO < 4 wt%. The reader needs to be aware that while this technique is quite effective in isolating crustal ilmenites from the data set, ilmenite also occurs as a megacryst phase in melnoites. Sage (2000a) presents data for the I5-10 melnoite from the Sextant Rapids vicinity, which shows a few ilmenites with MgO and Cr_2O_3 concentrations as high as 10 and 1.25 wt% respectively. The I5-10 data is easily distinguishable from the Attawapiskat kimberlites which display elevated concentrations of Cr_2O_3 (>2wt%) and MgO (>8wt%). However, ilmenites from the LTSZ

kimberlites have compositions that are characterised by low Cr_2O_3 (< 2 wt%). Compositional overlap between melnoitic and some kimberlitic ilmenites is therefore inevitable. Ilmenite compositions from the Six-Pak melnoite in Michigan (Sage 2000a) and Callander Bay, Ontario (unpublished data) suggests that the majority of melnoitic ilmenite compositions are characterised by low Cr_2O_3 (<0.5 wt%) and MgO (< 8 wt%). Clearly, more ilmenite data from melnoitic samples is required to place definitive compositional constraints on kimberlitic versus melnoitic compositions.

A total of 646 ilmenites from the Coral Rapids study area were analysed by electron microprobe. Of these, 344 grains were classified as KIMs based on the criteria discussed above. Figure 14 shows the distribution of these data on the MgO vs. Cr_2O_3 binary plot. In addition to screening out crustal compositions this plot can also be used, somewhat crudely, to predict the oxygen fugacity (fO_2)

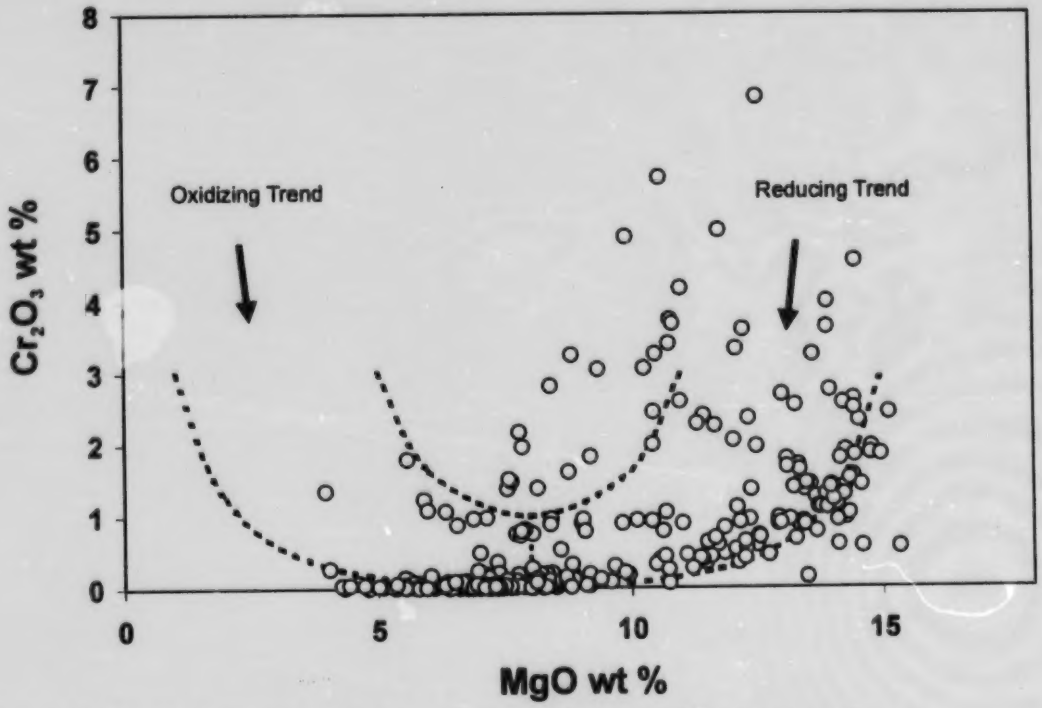


Figure 14. MgO vs. Cr_2O_3 plot for Mg-ilmenites recovered from the Coral Rapids study area.

conditions during crystal growth (Gurney and Moore 1991). However, both core and rim analyses of grains are required to properly predict if conditions during mineral growth trended towards oxidizing or reducing. As such, any interpretation of oxygen fugacity based on the data acquired here would be somewhat ambiguous. Nevertheless, there are a number of identifiable populations of Mg-ilmenites that occur in the study area. The first population includes numerous grains characterised by low Cr_2O_3 concentrations and MgO values that range between about 4 and 10 wt%. This population may be derived from melnoites (as suggested by Kong et al. 1999) but similar compositional trends are also observed in the LTSZ kimberlite field, and therefore a kimberlitic origin can not be excluded. A second noticeable population is characterised by high MgO concentrations (>10 wt%) with low to moderate Cr_2O_3 concentrations and it is probable that this group is from a kimberlitic source. The third population is more erratic and consists of grains with elevated Cr_2O_3 and variable MgO concentrations. This group

(particularly grains with Cr_2O_3 > 2 wt%) are somewhat unique to kimberlites and are not reported to occur in other alkaline intrusive rocks.

The regional distribution of Mg-ilmenite KIMs is shown in Figure 15. As with the garnet KIM population the most anomalous sites occur in the western part of the study area. Important sites include: KAP 1962 and KAP 1969 on the Mowbray Creek/Opasatika River/Missinaibi River system; KAP-1999 on the Mattagami River; and KAP-2122 on the Abitibi River. There are many other anomalous sites but the ones listed above represent ilmenite grain counts that statistically exceed the 99th percentile. The heavy mineral fractions in all of these samples are relatively large and as such only representative populations of grains (between 20 and 29 grains for these samples) were picked for microprobe analysis. The proportional dot diagram shown in Figure 15 represents a normalised grain count estimate.

Summary statistics and mineral chemistry for all ilmenite grains are listed in Appendix C and MRD 87 (Appendix D, Ontario Geological Survey 2001d).

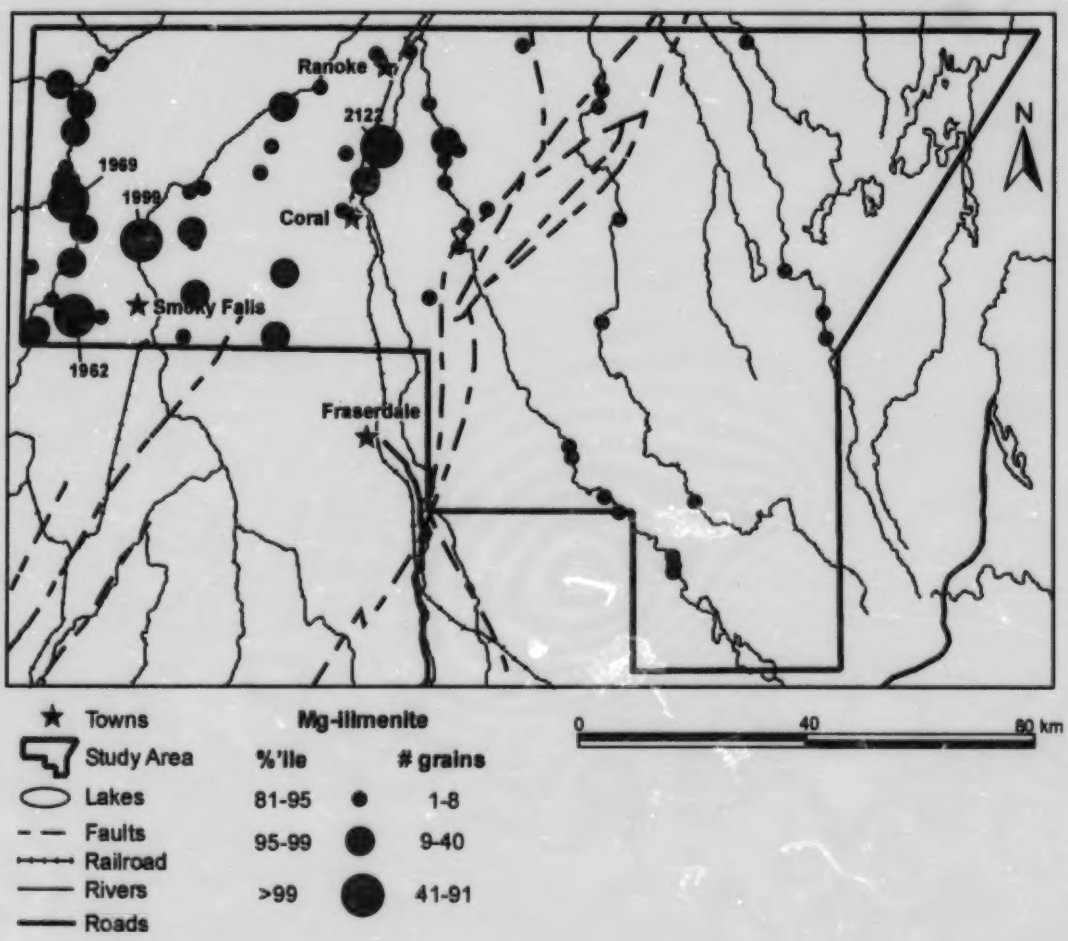


Figure 15. Regional Distribution of Mg-ilmenites in the Coral Rapids study area

Cr-Diopside

Cr-diopside is one of the major mineral components of the lherzolite peridotite assemblage. Since lherzolites are not major sources of diamonds (Gurney and Moore 1993) Cr-diopsides can only be considered useful as KIMs and not as diamond indicator minerals. In highly weathered terrains Cr-diopsides do not survive in the secondary environment and are therefore not usually discussed in literature that deals with exploration in warmer, tropical climates. However, in immature post-glacial terrains typical of the Canadian shield, Cr-diopsides are relatively stable and the recovery of this mineral can be a very important complement to the KIM suite.

One of the major problems encountered in the KSZ is that Cr-diopsides are, on average, more abundant than other phases in the heavy mineral fraction. The real challenge then becomes deciding on how to isolate Cr-diopsides carried by kimberlites versus other sources. The use of Cr_2O_3 thresholds to delineate kimberlitic versus non-kimberlitic sources has some merit for high Cr-diopsides but there are many examples from lherzolites that have low to moderate Cr_2O_3 concentrations. This is largely due to the fact that the kosmochlor molecule ($NaCrSi_2O_6$) becomes less soluble in the pyroxene structure at high pressures and experimental work (Vredevoogd and Forbes 1975) suggests that this molecule will not enter the diopside structure at pressures in excess of 45 kb (approximately 140 km depth). This is generally supported by the fact that high pressure sheared lherzolite xenoliths are Cr-poor relative to lower pressure granular lherzolites. It is speculated that at such elevated pressures Cr only enters the diopside structure as a Tshermak type molecule.

The common occurrence of high Cr-diopsides in geological environments that are not of high pressure origin has necessitated the use of different discriminants to isolate clinopyroxenes derived from mantle sources. Morris et al. (2000) proposed that the 3 component Al-Na-Cr system (atomic proportions) can be used to delineate a field unique to peridotitic Cr-diopsides sampled by kimberlites. This approach utilises a ternary diagram and the resulting template is based on data compiled from a variety of mantle xenoliths, xenocrysts isolated from kimberlite heavy mineral concentrates and many non-kimberlitic sources. It is clearly an advance from pre-existing methods that utilise Cr_2O_3 thresholds since many Cr-diopsides reported in this study are not mantle derived yet have elevated concentrations of Cr_2O_3 (up to 1.9 wt%).

Projection of the Coral Rapids study area clinopyroxene data onto the Al-Na-Cr ternary diagram (Figure 16) indicates a number of different populations. A large cluster of Cr-diopsides plot within the field identified as mantle derived compositions. This cluster of compositions appears to be part of a large population of grains that forms an ovoid on the ternary plot which trends from elevated Al/Na ratios and intersects the template for mantle compositions at lower Al/Na ratios. The total number of grains from this population that plot within the highlighted template is substantial (total of 489) and certainly not in proportion with other xenocrystic KIMs isolated from the same samples. This suggests that the clinopyroxenes isolated from samples collected in the vicinity of the KSZ require special consideration and an additional screening mechanism is warranted.

The Cr-diopside data from the Coral Rapids study area has been subdivided into 4 distinct compositional groups based on the populations identified for the Foleyet study area (Ontario Geological Survey 2001c). The most effective way to illustrate these groups is to project the data on a binary plot of atomic Ca/(Ca+Mg) vs. Na_2O wt % (Figure 17). Although somewhat arbitrary and possibly only applicable to this data set, the division of these groups can be made in the following way. Group I clinopyroxenes were identified on the basis of Na_2O concentrations < 0.3 wt %. Group II clinopyroxenes have Na_2O concentrations > 0.3 wt % and Ca/(Ca+Mg) ratios < 0.45. Group III clinopyroxenes have Na_2O concentrations > 0.3 wt % and Ca/(Ca+Mg) ratios that range between 0.45 to 0.5. Group IV clinopyroxenes are characterised by Na_2O concentrations > 0.3 wt % and Ca/(Ca+Mg) ratios > 0.5.

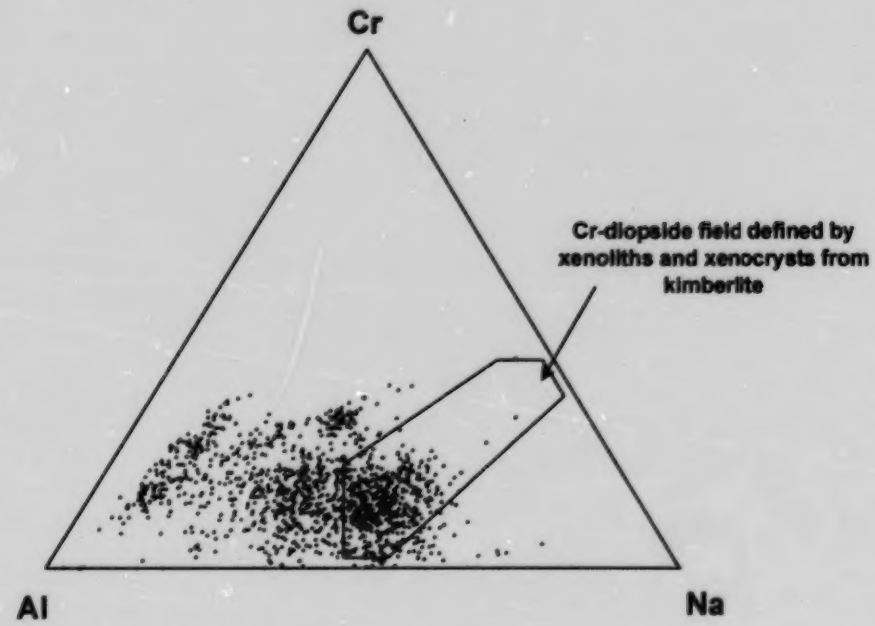


Figure 16. Al-Na-Cr (atomic) clinopyroxene ternary diagram for samples from the Coral Rapids study area (after Morris et al. 2000).

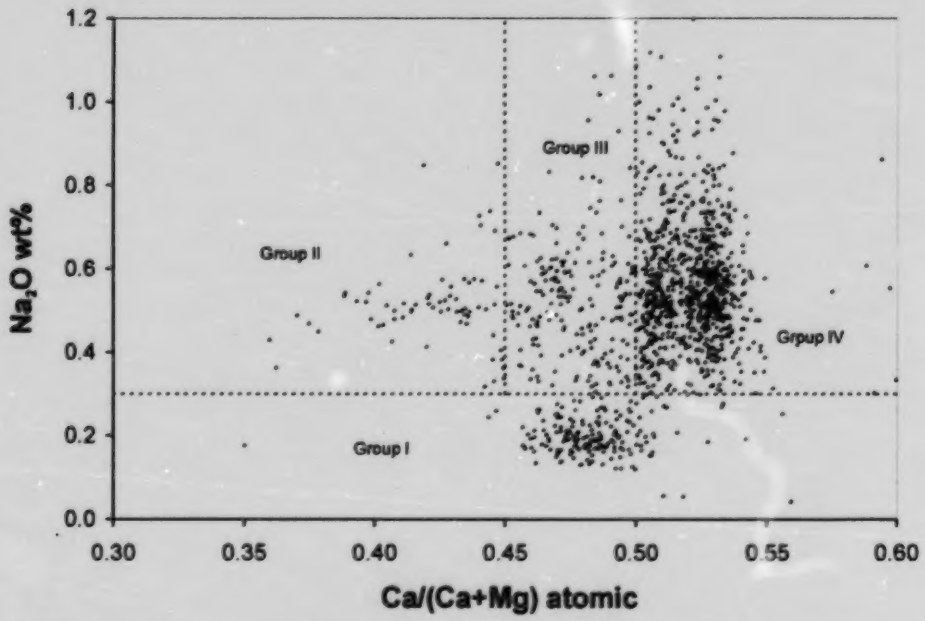


Figure 17. Ca/(Ca+Mg) vs. Na_2O plot for clinopyroxenes from the Coral Rapids study area. Compositional divisions are somewhat arbitrary and based on compositions found in the Foleyet study area (Ontario Geological Survey 2001c)

The choice of Na_2O as a variable on this diagram is important since there is a correlation between pressure and the amount of Na that can enter the clinopyroxene structure in the form of the jadeite molecule ($NaAlSi_2O_6$). To demonstrate the importance of Na_2O as a discriminant, Cr-diopsides from both peridotite xenoliths carried in kimberlites (globally occurring) and xenocrysts from the Attawapiskat kimberlite field have been plotted on the Ca/(Ca+Mg) vs Na_2O binary plot (Figure 18). This plot shows a definitive range of Ca/(Ca+Mg) ratios and Na_2O concentrations that can be used to place further constraints on mantle derived clinopyroxene compositions.

Stephens and Dawson (1977) used a statistical approach to classify the various types of clinopyroxenes found in kimberlites including: xenolithic; megacrystic; and magmatic (only in type II kimberlites or orangeites) phases. The largest cluster they isolated was characterised by Cr-diopsides originating from spinel and garnet lherzolites. This group displays a range of Ca/(Ca+Mg) ratios (0.4 to 0.52) which corresponds well with the range defined in Figure 18. The Ca/(Ca+Mg) axis has an added benefit since it represents the Mg-Ca axis on the pyroxene ternary classification scheme (Morimoto et al. 1988). As such, atomic Ca/(Ca+Mg) ratios can be used to discriminate diopside (Ca/(Ca+Mg) = 0.4 to 0.5) from augite (Ca/(Ca+Mg) < 0.4).

If the 489 analyses that plot in the compositional field for mantle derived Cr-diopside on the Al-Na-Cr ternary plot (Figure 17) are recast onto the Ca/(Ca+Mg) vs. Na_2O binary plot, it is apparent that only a few of the grains have compositional characteristics similar to Cr-diopsides found in subcratonic mantle xenoliths. In fact, the 21 grains isolated here (Figure 19) represent a somewhat liberal estimate of mantle type Cr-diopside compositions since most of these analyses are characterized by Na_20 poor compositions that are not typical of the xenocryst population isolated from, for example, the Attawapiskat kimberlites. The majority of the 489 analyses isolated on the atomic Al-Na-Cr ternary plot are from groups III and IV. The group IV clinopyroxenes have the widest range and most elevated concentrations of Na_2O and it is speculated here that this group probably represents a high pressure assemblage. It is interesting to note that the group IV pyroxenes do not classify as Cr-diopsides using the scheme of Morimoto et al. (1988) since the Ca/(Ca+Mg) ratios for this group is > 0.5.

The use of 2 discrimination techniques is clearly warranted for the Cr bearing clinopyroxenes found in modern alluvium from the Coral Rapids study area. The 21 Cr-diopsides identified here as having mantle type geochemical signatures are distributed throughout the study area (Figure 20). Since the number of identified clinopyroxene KIMs is limited there are no sites that stand out as being highly anomalous. A number of grains do occur along the Mowbray Creek/Opasatika River/Missinaibi River system and others occur on the Mattagami, Abitibi, Little Abitibi and North French rivers.

The regional distribution of the large number of Cr bearing clinopyroxenes that do not classify as sub-cratonic mantle type Cr-diopsides is discussed below in the component of the report that deals with MMSIMs®. Summary statistics and mineral chemistry for all clinopyroxene grains are listed in Appendix C and MRD 87 (Appendix D, Ontario Geological Survey 2001d).

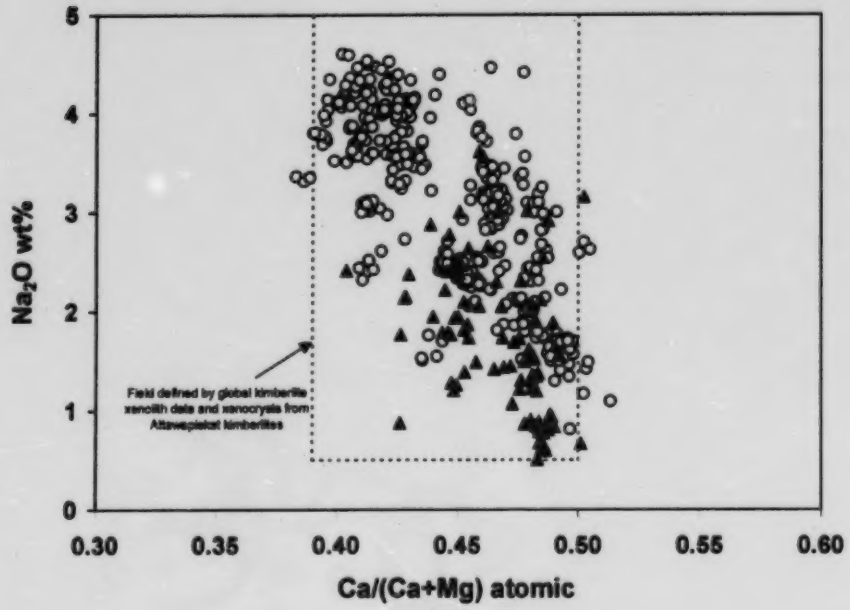


Figure 18. Ca/(Ca+Mg) vs. Na_2O binary plot for lherzolite zenoliths from kimberlites (global) and xenocrysts from Attawapiskat kimberlites. The compositional field outlined here is based on available data and may be subject to modification. Symbols are as follows: shaded triangles; Cr-diopside from globally occurring mantle xenoliths in kimberlite; open circles, xenocrysts from Attawapiskat kimberlites.

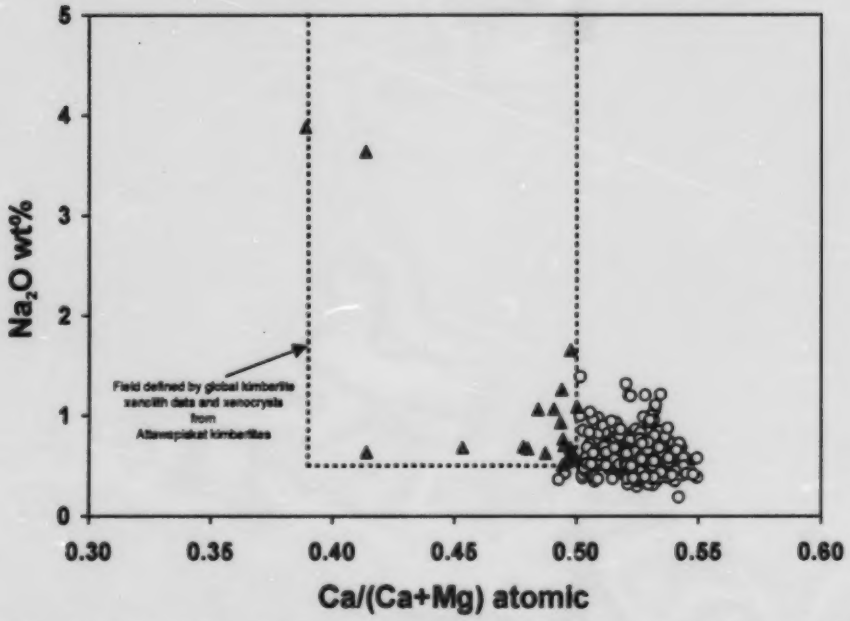


Figure 19. Ca/(Ca+Mg) vs. Na_2O classification scheme for clinopyroxenes from the Coral Rapids study area that plot within the field defined by mantle xenoliths and xenocrysts on the Al-Na-Cr ternary diagram (Figure 16). The triangles represent grains that have compositional similarities to the data presented in Figure 18.

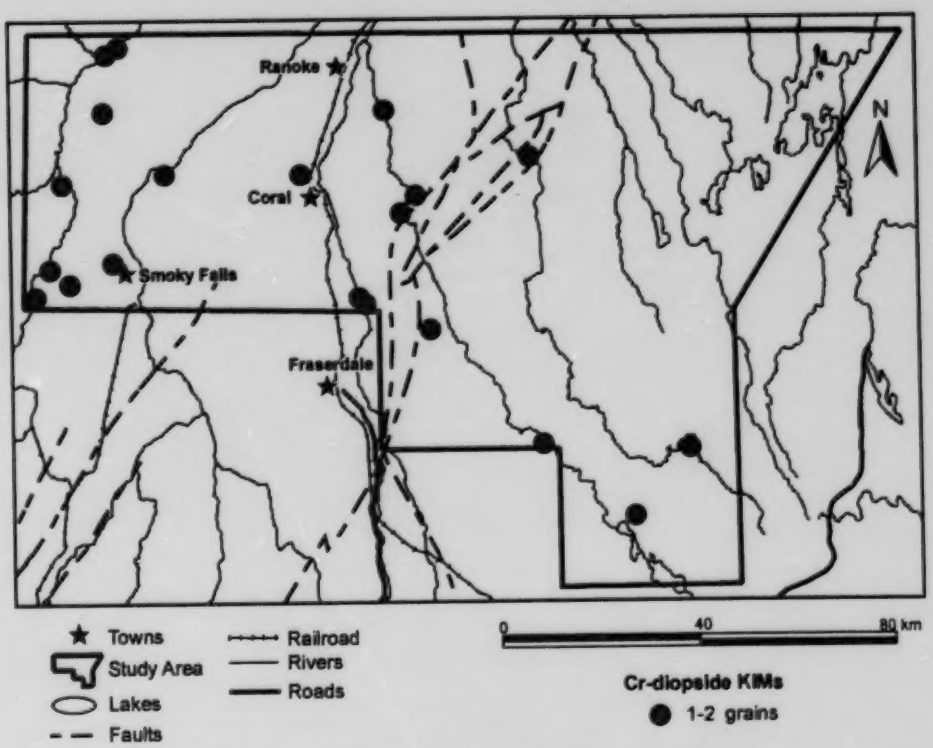


Figure 20. Regional distribution of Cr-diopside KIM grains in the Coral Rapids study area.

Olivine

Olivine occurs as both a megacryst (cognate) and phenocryst phase in kimberlites. In addition, olivine is also a common component in mantle peridotite xenoliths and as such it is expected that olivine will also occur as a xenocryst phase in kimberlites. The identification of each of these types of olivine is not critically important during exploration. What is important is that olivines from non-kimberlitic sources be isolated and removed from the KIM database. The recovery of olivine in modern alluvium samples is indicative that the weathering regime in a prospective area is immature. In mature weathering environments olivine readily breaks down to form secondary minerals such as goethite and smectite (Nahon et al. 1982; Crabtree 1989).

Olivine has been isolated from samples collected in the KSZ during previous studies (Morris et al. 1994; Morris et al. 1997a; Morris et al. 1998a; Stephenson et al. 1999). Substantial numbers of olivine grains were also recovered from the vicinity of the Killala Lake igneous complex northeast of Terrace Bay (Morris et al. 2000). The collective results of these projects demonstrated the need for a geochemical discriminative technique capable of isolating olivines derived at high pressures from those found in shallower crustal type environments. Morris et al. (2000) utilised a binary discriminant system ((Mg/Mg+Fe) vs. SiO_2 wt%) that is capable of isolating olivine compositions from kimberlitic and other mafic rocks, although compositional overlap is substantial. In an attempt to improve on this technique a system is presented here that utilises a large database of olivine compositions isolated from numerous kimberlitic heavy mineral concentrates from Ontario (unpublished data).

Examination of minor element concentrations from 951 olivine grains picked from the Ontario kimberlite heavy mineral concentrates suggests that additional constraints may be placed on mantle type olivine compositions crytallized at high pressures. Figure 21a illustrates the distribution of the olivine data when plotted on a binary plot of forsterite content (Fo#) vs. CaO wt%. The kimberlitic compositions are characterised by depleted CaO concentrations when compared, for example, to olivines isolated from Abitibi komatiites (unpublished data). This is likely due to a combination of pressure (Finnerty 1986) and also the effects of magmatic cooling rates. Partition coefficient data suggests that given enough time, incompatible elements will diffuse out of the olivine structure. Rapidly cooling supracrustal lavas will likely favour the incorporation of incompatible elements in the olivine structure and this would therefore be expected in the Abitibi komatiites. The komatiite data also displays elevated concentrations of Al_2O_3, TiO_2 and Cr_2O_3 relative to those found in kimberlites. The use of both the Fo# and incompatible element concentration appears to be an improvement over previous methods. However, it should be noted that olivines of similar composition to those found in kimberlites do occur in layered mafic complexes such as the Kigplait anorthosite intrusion, Labrador (Morse 1996). Although this approach is an improvement on previous methods the reader needs to be aware that compositional overlap between high pressure olivines and those crystallized at lower pressures is therefore inevitable if all of the above factors are taken into consideration.

A total of 412 olivines were isolated from samples collected in the study area. Of these, 13 grains from 8 sample sites have compositions that are similar to those found in kimberlitic olivine xenocrysts (Figure 22a and b). The regional distribution of olivines with KIM type signatures occurs primarily on the Abitibi River (Figure 23a). However it should be noted that the majority of the olivine grains recovered from the Coral Rapids study area are from a small number of sites located along the Abitibi River north of Coral Rapids to the confluence of the Abitibi and Little Abitibi rivers (Figure 23b). It is therefore suggested that the olivines identified here with similar signatures to those found in kimberlite are more likely part of a much larger population of non-kimberlitic olivines. As mentioned above, potential for compositional overlap should be taken into consideration when evaluating these types of anomalies.

Summary statistics and mineral chemistry for all olivine grains are listed in Appendix C and MRD 87 (Appendix D, Ontario Geological Survey 2001d).

Important Physical Characteristics of Indicator Minerals Recovered from the Coral Rapids Study Area

One of the most interesting aspects of this study is the physical characteristics of indicator minerals isolated from samples collected in the Moose River Basin. During the picking process, Overburden Drilling Management noted that many of the KIM grains isolated from samples collected in the Coral Rapids study area have distinctive shapes and textures. Specifically, many of the grains appear to be rounded and have a frosted surface texture. It was also noted that the ratio of rounded to angular KIMs appears to increase northward along the KSZ from the southernmost study area (Chapleau) to the northernmost study area (Coral Rapids).

A previous study of KIM occurrences in the Moose River Basin (Wolfe et. al 1975) noted that almost all of the Cr-pyrope grains (> 0.5 mm) collected from modern alluvium samples were highly rounded. They attributed the shape of the grains to the effects of glacial transport over large distances

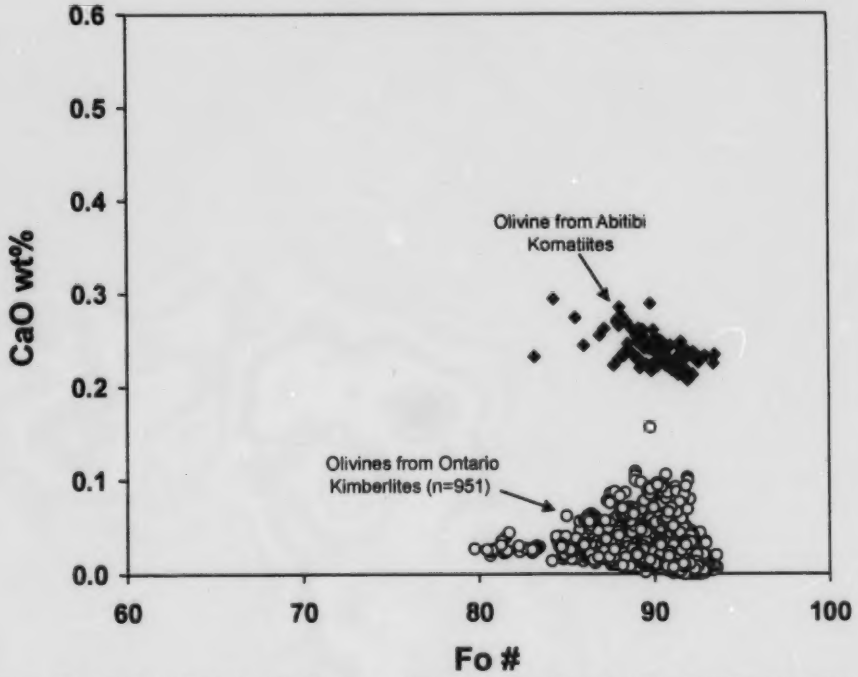


Figure 21a. Fo# vs. CaO plot for olivines isolated from numerous heavy mineral concentrates from Ontario kimberlites. The data from Abitibi komatiites has been included to demonstrate the compositional differences between olivines crystallized at low and high pressures. Compositional overlap between mantle derived olivines and those from layered igneous complexes can be expected.

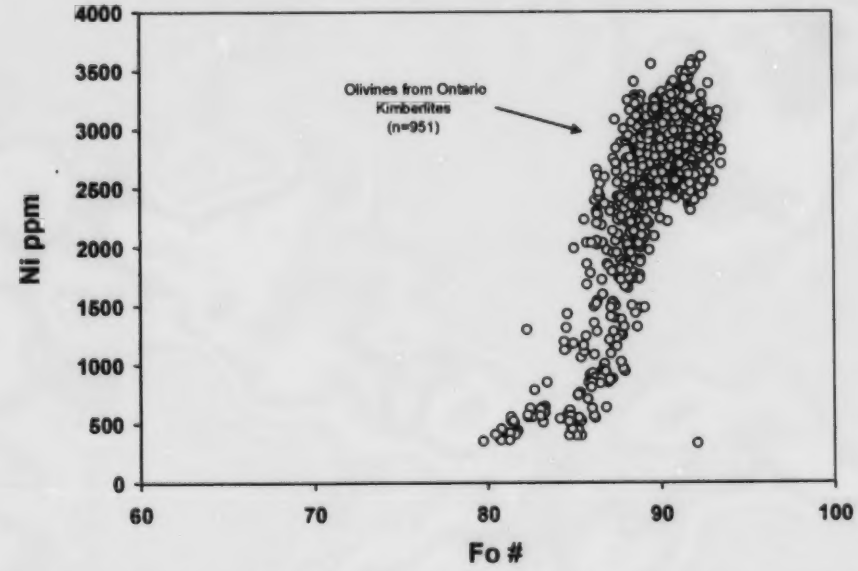


Figure 21b. Fo# vs. Ni plot for olivines isolated from numerous heavy mineral concentrates from Ontario kimberlites.

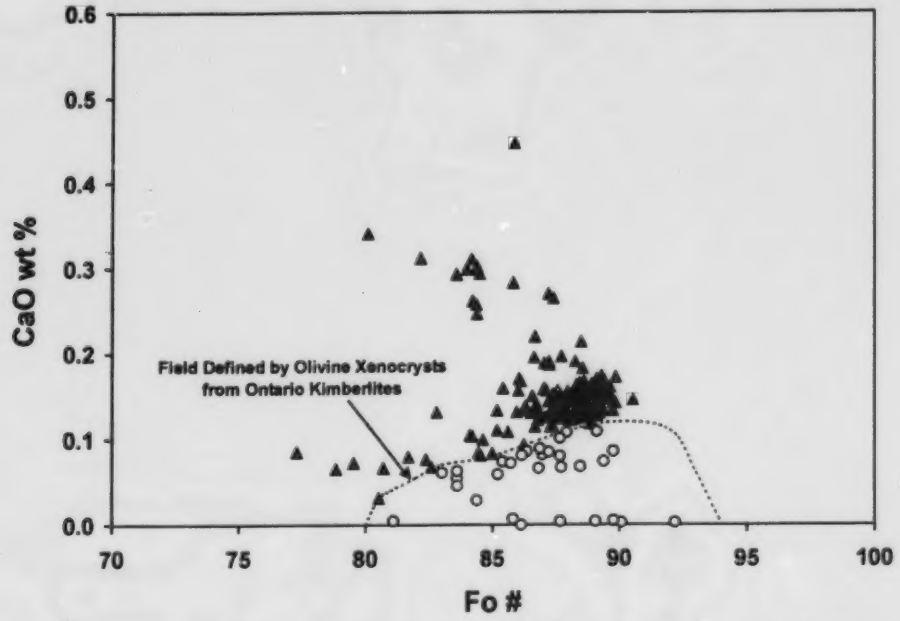


Figure 22a. Fo# vs. CaO plot for olivines recovered from the Coral Rapids study area. Symbols are as follows: open circles, olivines with compositions similar to those observed in kimberlite xenocrysts; shaded triangles, non-kimberlitic olivines.

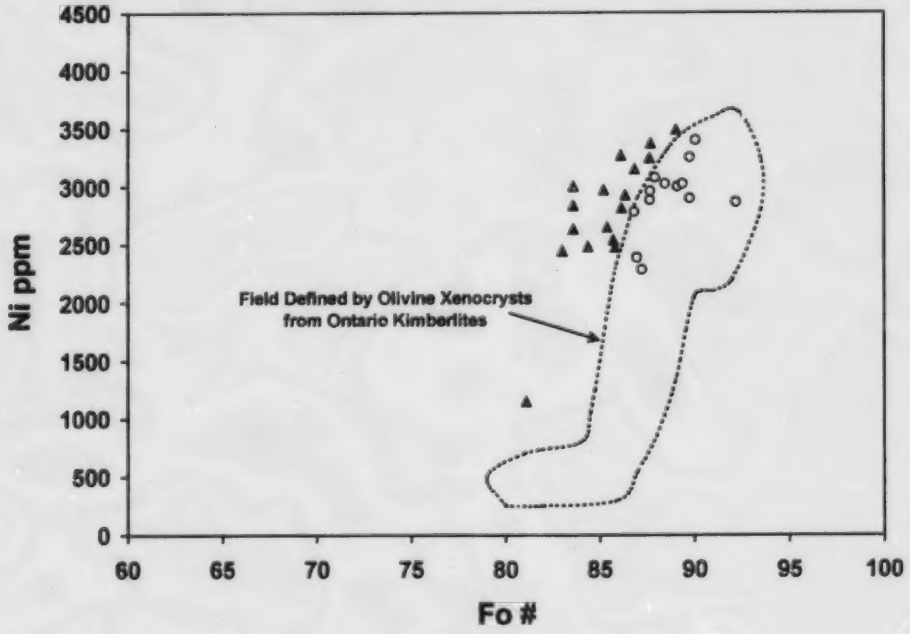


Figure 22b. Fo# vs. Ni plot for olivines recovered from the Coral Rapids study area. Only grains that plot in the kimberlitic field in Figure 22a are plotted on this diagram. Symbols are as follows: open circles, olivines with compositions similar to those observed in kimberlite xenocrysts; shaded triangles, non-kimberlitic olivines..

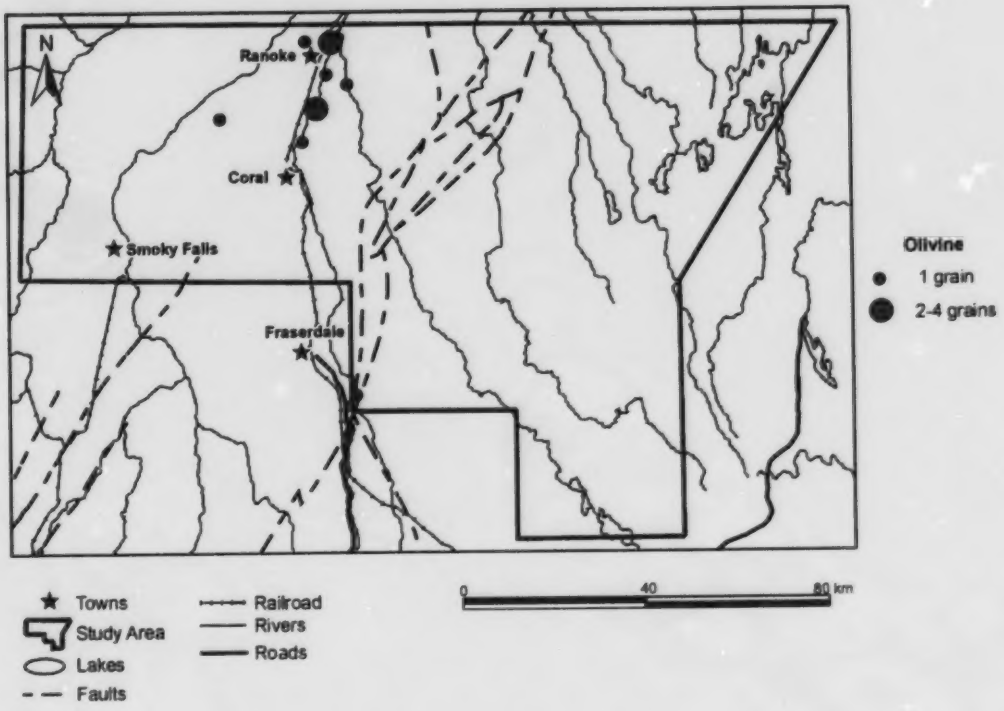


Figure 23a. Regional distribution of olivine KIMs in the Coral Rapids study area. Results are reported as raw data.

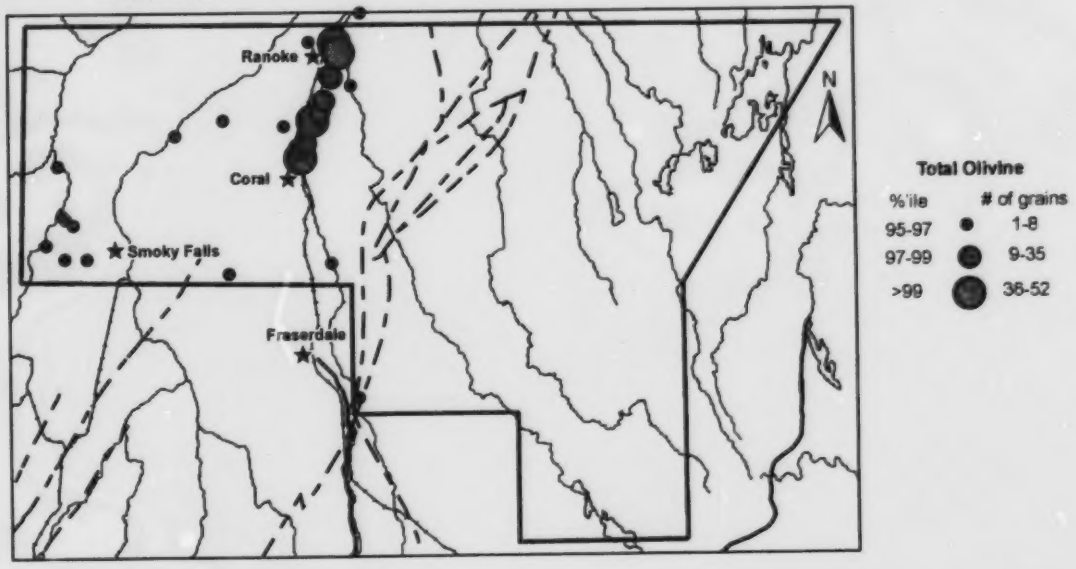


Figure 23b. Regional distribution of total olivine grains recovered from the Coral Rapids study area. Results are reported as raw data

from an up-ice source. In fact, it is improbable that glacial transport could produce such uniform grains with a high degree of roundness without any significant chips or breaks in the grains. It is more plausible that these grains show evidence of abrasive wear typical of either eolian environments or a combination of eolian and high energy fluvial type environments. It has been demonstrated experimentally (Keunen 1959) that the process of mechanical abrasion during extensive river transport has very limited effect on the rounding of quartz grains. Experimental studies of eolian abrasion (Kuenen 1960) supports the notion that wind is a far more effective mechanism for producing grain rounding and frosting than fluvial processes. However, the causes of frosting on grain surfaces cannot be restricted to eolian abrasion as the combined effects of physico-chemical processes that involve corrosive dissolution as well as physical degradation (Kuene and Perdok 1962) may play a significant role.

Examination of the heavy mineral concentrates from samples collected in this study show that the majority of mineral grains are angular to sub-angular and are quite diverse in terms of mineral species. Highly rounded grains make up only a small component of the concentrate but never-the-less do account for a significant proportion of the KIMs. Other grains that appear to be common in the rounded particle fraction include garnets, ilmenites and spinels of crustal provenance. The vast majority of grains probed as part of this study are spinels, and as discussed previously, only a small fraction of these can be considered as KIMs. In order to evaluate the true significance of grain shape and texture in the Coral Rapids samples, it is necessary to focus on mineral grains that can be positively identified as mantle derived. Cr-pyrope garnets are the most definitive KIM since these minerals only occur in high pressure environments. Because of this, it was decided that the shape and texture of the garnet population should be investigated in order to try to shed some light on secondary processes that may have had an impact on the transportation of these minerals from source.

Close examination of the KIM garnets indicate that the majority of the 0.25 to 0.5 mm grains are angular and outnumber rounded grains by a ratio of 3:1. However, the proportion of angular to rounded grains in the 0.5 to 1.0 mm size fraction is approximately 1:2. This suggests that either the larger grain sizes have been subjected to different secondary processes or are affected differently by these secondary processes. Alternatively, the smaller garnet grains may represent broken pieces of the larger grain population. The lack of remnant rounded surfaces on the 0.25 to 0.5 mm grains would seem to discount this possibility. The work of Kuenen (1960) demonstrated that eolian erosion is more effective on larger sized grains and would be ineffective on grains < 0.05 mm in diameter. However, grains in the 0.25 to 0.5 mm size fraction should also be subject to erosion. The highly angular nature (multiple conchoidal factures) of many of the 0.25 to 0.5 mm garnets would suggest that these grains have probably been subjected to different secondary processes than the rounded grains more typical of the 0.5 to 1.0 mm size fraction.

The somewhat typical appearance of the rounded and frosted grain population is demonstrated in Figure 24a and Figure 24b. In this example a garnet and a chromite grain (both from sample KAP-1969) exhibit a high degree of rounding and pitting with little evidence of any major conchoidal fractures. Some of the chromite grains from the same sample exhibit good octahedral habit with minimal rounding (Figure 24c and Figure 24d) suggesting a different source and/or different modification processes occurring in the secondary environment. The chromite grain shown in Figure 24d (sample KAP-1969) exhibits a conchoidal fracture with semi-parallel steps. It has been suggested that this type of feature may be caused by the effects of shear stress often associated with glacial transport (Krinsley and Donahue 1968).

The implication of the physical characteristics discussed herein is that the highly rounded population of grains have likely been through more than one "cycle" in the secondary environment. Identifying the types of environments and distances of travel that this population may have incurred prior to deposition in modern alluvial sediments is a difficult task. A possible source of both types of grain populations is from the extensive Cretaceous sediments in the Moose River Basin. The lower Cretaceous Mattagami

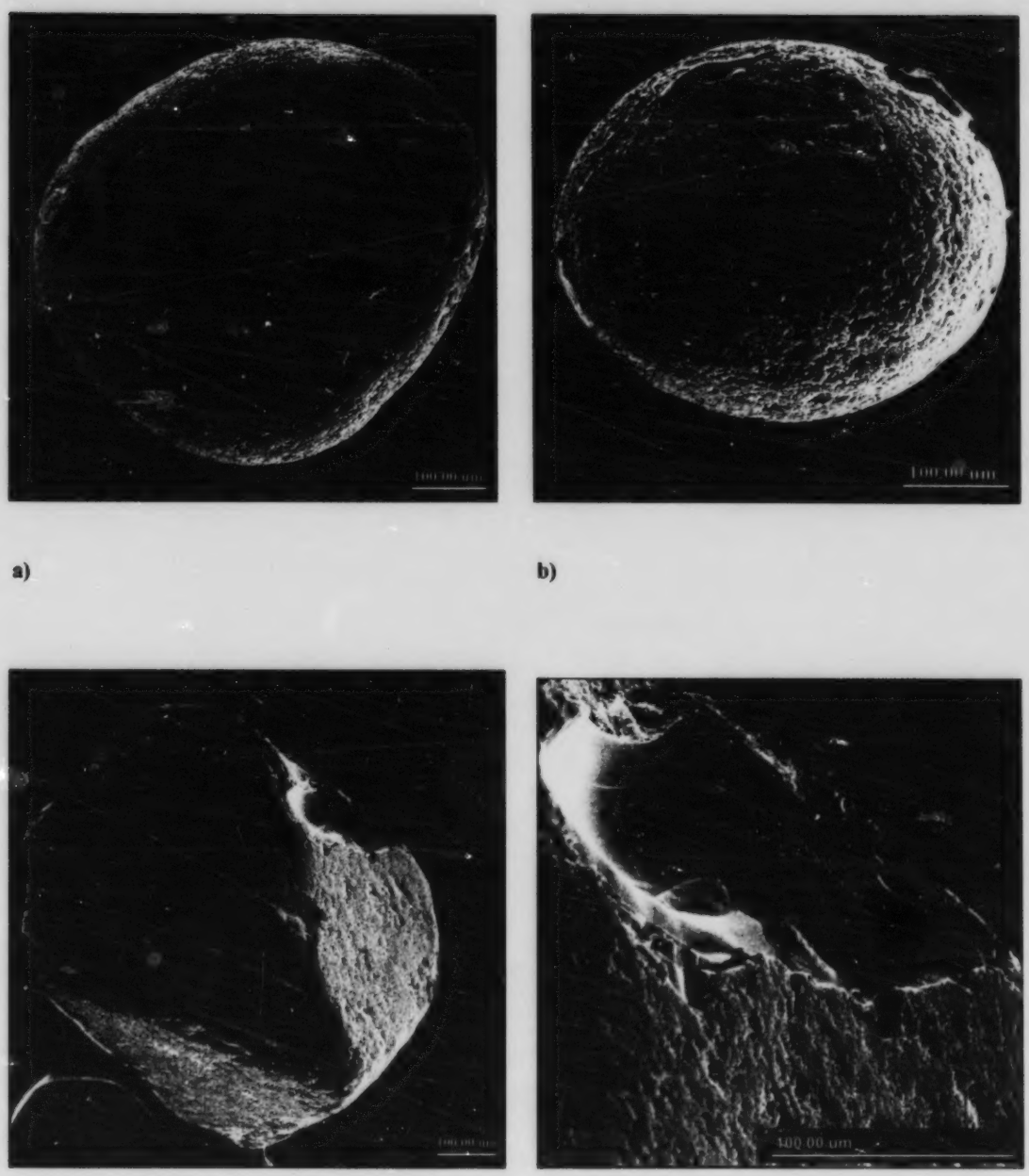


Figure 24. SEM images (secondary electron) illustrating shapes and textures of grains isolated from sample KAP-1969, a) garnet, b) chromite, c) chromite displaying octahedral form, d) sub-parallel steps in conchoidal fracture of chromite grains from Figure 24c.

Formation outcrops on some of the rivers and creeks in the basin (Telford 1982) and it is not unreasonable to suggest that the KIMs may have been deposited in river channels through the erosion of Mesozoic sediments by modern alluvial processes. Another possibility is that the grains may have been transported down ice from an unknown distal source. However, as discussed previously, the highly rounded grain population show little evidence of glacial transport based on unique physical characteristics commonly observed in grains that have been affected by these processes (see Krinsley and Donahue 1968 for a review).

The importance of the textural characteristics of the KIM population should therefore not be overlooked. The distance of travel and number of erosion cycles is not known. It is possible that many of the grains have not travelled far yet have undergone extensive re-working in the secondary environment. It is just as plausible that the transport distance may be significant. Our knowledge of the Mesozoic stratigraphy in the basin is based on very limited drill core studies. The significance of anomalous KIM sites should therefore be treated with a reasonable degree of caution.

Recommendations for Kimberlite Exploration

Examination of the composition and distribution of kimberlite indicator minerals in the Coral Rapids study area has identified several areas containing anomalous numbers of KIMs (Table 1). The exploration targets within the study area (Figure 25) are based on sample sites containing a combination of significant KIMs such as G10 garnets, G9 garnets, Mg-ilmenites, chromites, Cr-diopsides and olivine. Sample sites with single mineral anomalies should probably be considered with caution unless these occur in the vicinity of other anomalous sites.

There are numerous areas highlighted in Figure 25 and Table 1 that contain anomalous sample sites. These include: Mowbray Creek/Opasatika River south (area 1); Friday Creek/Opasatika River north (area 2); Pike River south (area 3); Pike River north (area 4); Onakawana/Abitibi River (area 5); Bad River/Little Abitibi north (area 6); Little Abitibi River south (area 7); North French River (area 8); and Wakwayokastik River (area 9). Probably one of the most significant findings of this study is the dominant garnet and picro-ilmenite anomaly that occurs along the Opasatika River in the western part of the study area. This anomaly extends from the Archean terrain of the Quetico subprovince into the Moose River basin where the Opasatika River cuts through Cretaceous sediments. Since this anomaly does not occur in the vicinity of the melnoites identified by BP-Selco (see Figure 6) it is suggested here that this should be considered the most prospective region in the study area. Futhermore, there are many examples from the data-set of Cr rich picro-ilmenites along the Opasatika River suggesting a kimberlitic or non-melnoitic source for these grains. Other important anomalies occur on the Pike River (areas 3 and 4), Onakawana/Abitibi River (area 5) and BadRiver/Little Abitibi River (area 6). There are significant garnet and picro-ilmenite anomalies in these areas although close proximity to known melnoites along these river systems may suggest a source other than kimberlite.

If all 4 OTH study areas are taken into consideration, it is fair to conclude that the Coral Rapids study area has yielded the most significant numbers of important KIMs. Specifically, sample sites in the western part of the study area have yielded many Cr-pyrope garnets (including G10s) and Cr-rich picro-ilmenites. The occurrence of G10 garnets in the study area is both important and encouraging. What is not well understood is whether the numbers of grains observed in samples from the Moose River Basin are the result of heavy mineral pre-concentration processes that may have been active during Mesozoic times. The subsequent erosion of these sediments by glacial and modern alluvial processes could in theory intersect mature Mesozoic sedimentary horizons producing somewhat erroneous anomalies. Since we have very limited knowledge of the Mesozoic stratigraphy in the area it is not clear as to whether this may or may not be the case. The occurrence of significant garnet and ilmenite anomalies south of the

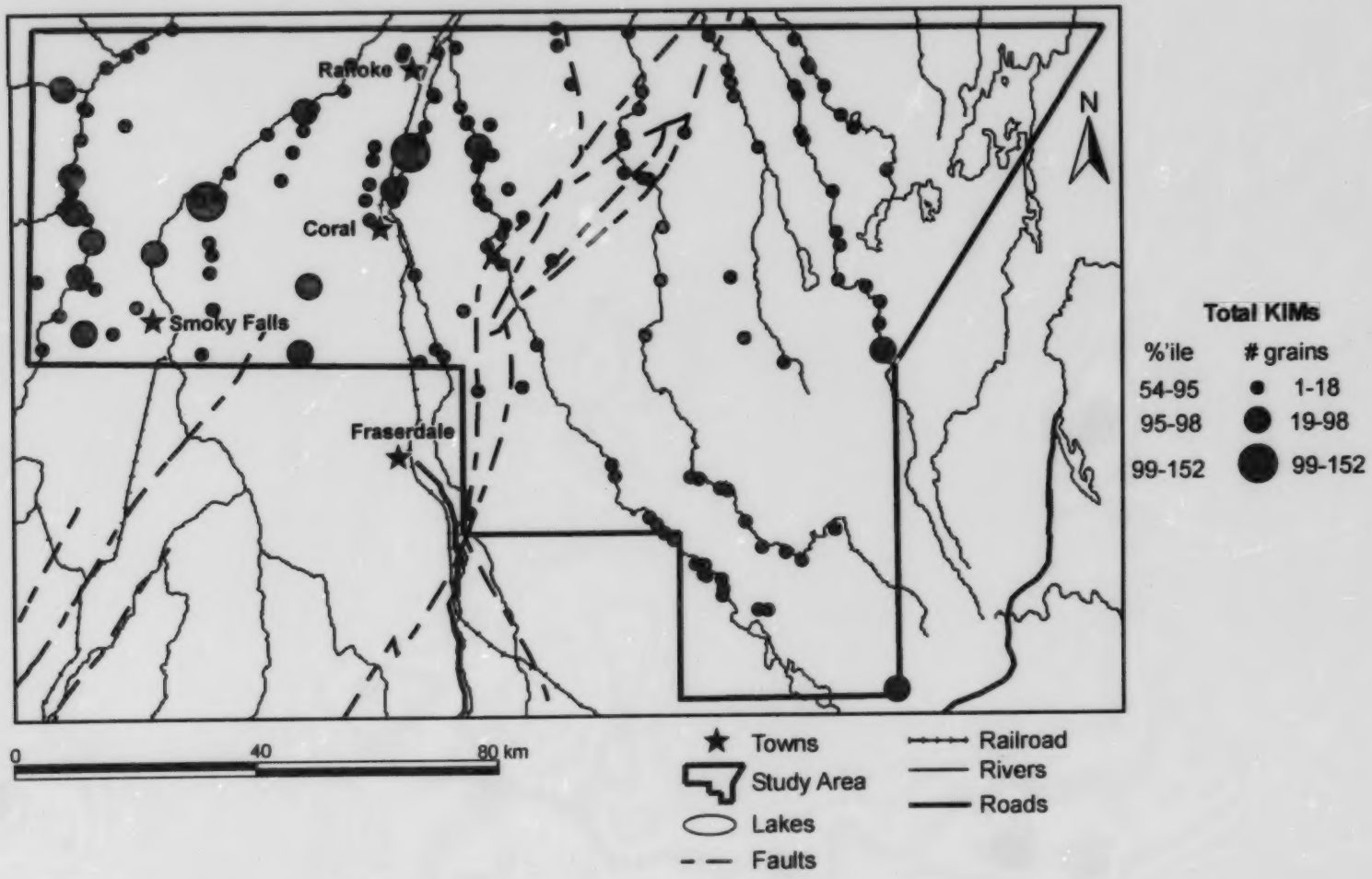


Figure 25a. Regional Distribution of total KIMs in the Coral Rapids study area.

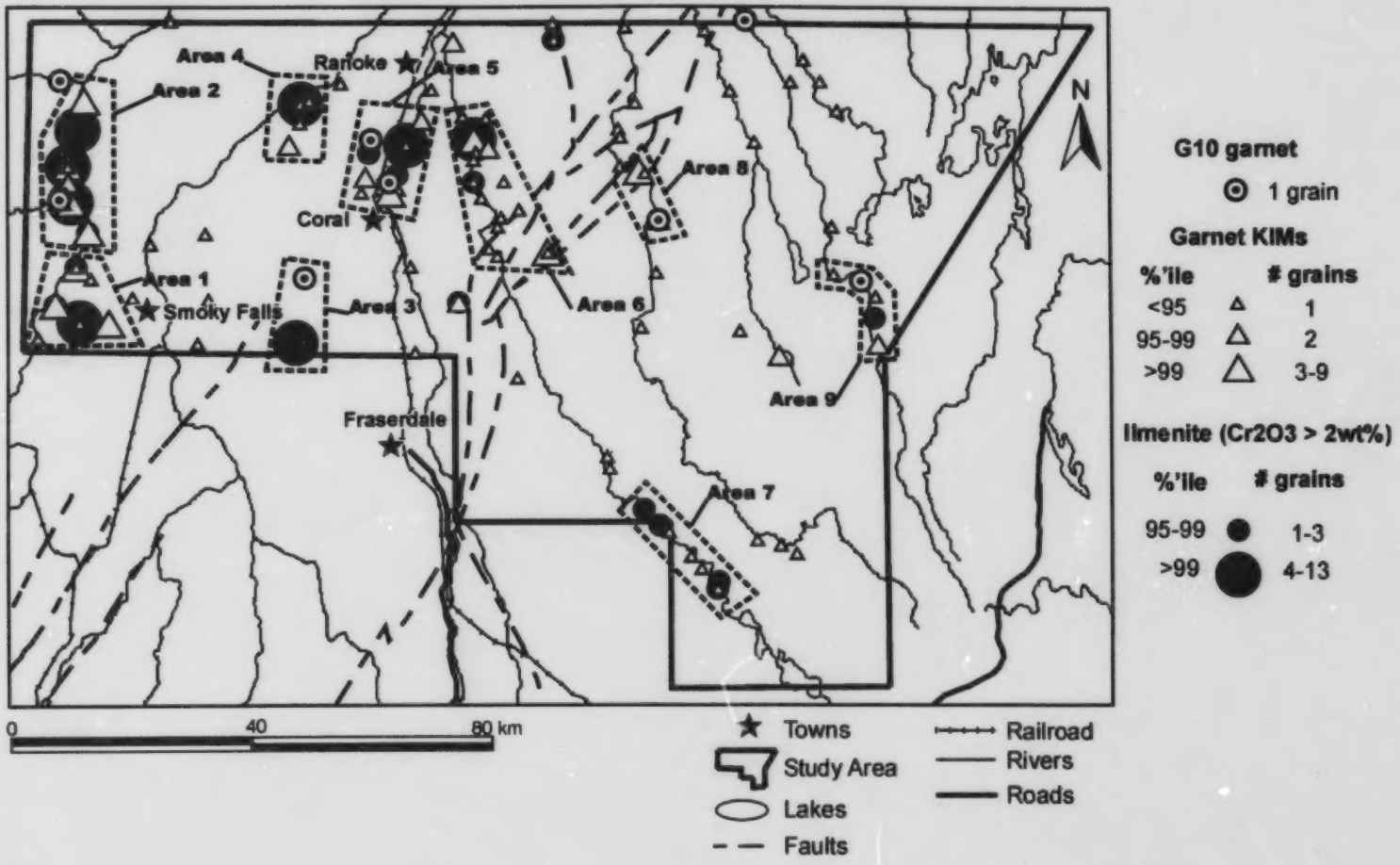


Figure 25b. Regional distribution of total KIMs in the Coral Rapids study area

Table 1. Summary table of samples containing the most significant numbers and types of KIMs in the Coral Rapids study area. Numbers in parentheses represents data that has been normalised on the basis of picked versus estimated grain counts.

Sample KAP-	Easting	Northing	garnet	chromite	ilmenite	pyroxene	olivine	KIM types	Total KIMs
Mowbray Creek/Opasatika River south (area 1)									
1897	394819	5542085	1	0	5(13)	1	0	3	7(15)
1910	406471	5544507	3	1(3)	1	0	0	3	5(7)
1961	401666	5544566	1	0	18(23)	1	0	3	20(25)
1962	401689	5544647	0	2(3)	39(91)	0	0	2	41(94)
1964	397690	5547585	4	0	5	1	0	3	10
1965	401098	5553925	5	1(4)	10(20)	0	0	3	16(29)
1968	403106	5559836	3	0	28(38)	0	0	2	31(41)
Friday Creek/Opasatika River north (area 2)									
1916	398413	5565264	2 (1 G10)	0	0	0	0	1	2
1927	399871	5568056	2	0	10	0	0	2	12
1969	400292	5564712	9	1(4)	23(49)	1	0	4	34(63)
1980	399853	5570666	3	2(20)	1	0	0	3	6(24)
1983	402468	5581698	3	0	3(9)	0	0	2	6(12)
1984	398618	5585164	1 (G10)	0	6(20)	0	0	2	7(21)
Pike River south (area 3)									
2000	438733	5552120	1	1(2)	7(19)	0	0	3	9(22)
2003	437282	5541156	0	0	7(26)	0	0	1	7(26)
Pike River north (area 4)									
1940	436218	5574353	2	4(10)	1	0	1	4	8(14)
1992	438205	5581155	1	3(8)	12(21)	0	0	3	16(30)
1993	439651	5581691	1	2(12)	3	0	0	3	6(16)
1999	413355	5557753	1	5(22)	25(45)	0	0	3	31(68)
Onakawana/Abitibi River (area 5)									
2121	452831	5568080	3	1(2)	10(15)	0	0	3	14(20)
2122	455648	5574204	1	2(97)	20(54)	0	0	3	23(152)
2176	449810	5575205	1 (G10)	1(3)	0	0	0	2	2(4)
2181	452897	5566153	3	1	0	0	0	2	4
2182	454147	5569265	0	0	1	0	1(110)	2	2(111)
Bad River/Little Abitibi River north (area 6)									
2169	466874	5575104	6	0	5(13)	0	0	2	11(19)
Little Abitibi River south (area 7)									
2056	498950	5509544	1	2(7)	0	0	0	2	3(8)
2070	506934	5500167	1	2(13)	3	0	0	3	6(17)
North French River (area 8)									
2149	497385	5561o25	2 (1 G10)	1(8)	1	0	0	3	4(11)
2252	494172	5569708	3	0	0	2	0	2	5
Wakwayowkastic River (area 9)									
2272	530929	5551574	1 (G10)	0	0	0	0	1	1
2277	533716	5540948	2	2(17)	0	0	0	2	4(19)
Individual Sites									
2302	479006	5556209	3	0	0	0	0	1	3
2209	511911	5595221	1 (G10)	0	0	0	0	1	1
2267	535820	5484321	0	3(29)	0	0	0	1	3(29)
1979	421881	5566345	0	3(100)	2	0	0	2	5(102)
2126	460492	5590876	0	0	1	0	4(161)	2	5(162)
2184	459514	5583895	0	0	0	0	1(101)	1	1(101)

Moose River Basin in the Quetico subprovince (Opasatika River) can be interpreted as evidence that either the anomaly is real and has not been influenced by the processes mentioned above, or that these sites are influenced by down ice transport of KIMs from within the Moose River basin.

There are many factors to consider when assessing this study area for kimberlite exploration. It is suggested here that the areas identified in Table 1 can be used as a starting point for planning exploration activities. There are many important factors to consider including the Quaternary geology, the influence of Mesozoic sediments, structural geology including the location of complex cross-cutting faults, and the clues that grain shapes and textures can provide in identifying processes that may have influenced the transportation of KIMs in the secondary environment. Finally, the reader should make use of available geophysical data such as the Kapuskasing-Chapleau aeromagnetic survey (Natural Resources Canada 2001). This data compilation was flown with flight line spacings of 200 m and covers some of the Coral Rapids study area.

Metamorphic/Magmatic Massive Sulphide Indicator Minerals

Metamorphic/magmatic massive sulphide indicator minerals (MMSIMs®) are stable heavy minerals that occur in: alteration zones associated with volcanogenic massive sulphide deposits in high grade terrains; in magmatic Ni-Cu sulphide deposits; and in skarn and greisen deposits (Averill 1999). The heavy mineral assemblages associated with each of these deposit types are listed in Table 2. The MMSIM® indicator mineral system has been developed on the basis of extensive experience in processing surficial materials associated with known base metal deposits. The recognition that anomalous concentrations of certain groups or pairs of minerals associated with these deposits can occur in secondary environment sediments provides the basis for utilising the MMSIM® system.

Common mineral associations in VMS type dispersion trains are gahnite-barite, chalcopyrite-spessartine (or Mn epidote), gahnite-chalcopyrite-staurolite (or anthophyllite) and red rutile-spinel-kyanite (or sillimanite). Gahnite is probably the most important MMSIM® since it is enriched in the ore metal (Zn) and is extremely stable in the secondary environment. Other MMSIMs® associated with VMS deposits include kyanite, sillimanite, staurolite and orthopyroxene. However, these minerals are also common in high grade metamorphic terrains, and therefore less emphasis should be placed on their recovery in the Coral Rapids study area.

Magmatic Ni-Cu indicator minerals are characterised by distinctive Cr-rich phases such as Cr-diopside, chromite, uvarovite, Cr-rutile and aluminous phases such as hercynite. Averill (1999) suggests that these phases are produced as a result of the separation of Ni-Cu-Fe-S liquids from ultramafic magmas which results in the subsequent enrichment of Mg, Fe, Cr, Al and Si in the residual melt. Other phases associated with these deposits include chalcopyrite, forsteritic olivine, Mg-orthopyroxene, Ni and Pt arsenides and PGE alloys.

One of the major challenges in dealing with this somewhat complex group of minerals is that many of these phases occur as common components in non-mineralized rocks. Averill (1999) suggests that olivine, orthopyroxene and chromite occurrences in alluvial samples should only be emphasised if other more diagnostic indicator minerals are present. This can also be extended to Cr-diopsides which are by far the most common minerals recovered from the Coral Rapids study area. Ideally, emphasis should be placed on the recovery of the ore phases themselves. However, sulphides are not particularly stable in the

Table 2. Indicator minerals commonly associated with base metal mineralization (after Averill 1999). Shaded areas indicate an association between mineral and type of deposit.

Indicator Mineral	VMS	Magmatic Ni-Cu	Skarn	Greisen	Other occurrence
Sillimanite					High grade metamorphic
Kyanite					High grade metamorphic
Corundum					High grade metamorphic
Anthopyllite					High grade metamorphic
Mg-spinel					High grade metamorphic
Sapharine					High grade metamorphic
Staurolite					High grade metamorphic
Dumortierite					
Mn-epidote					
Spessartine					metavolcanics
Gahnite					
Franklinite					
Willemite					
Barite					
Cinnabar					
Loellingite					
Native Au					
Orthopyroxene					High grade metamorphic
Cr-rutile					
Chalcopyrite					
Tourmaline					
Olivine (Forst)					Mafic igneous
Hercynite					
Low-Cr diopside					Mafic Igneous
Chromite					Mafic Igneous
Uvarovite					
Loellingite					
Rammelsbergite					
Sperrylite					
PGE alloys					
Olivine (kneb)					
Vesuvianite					
Johannsenite					
Grossular					
Scheelite					
Topaz					
Fluorite					
Cassiterite					
Wolframite					

secondary environment although chalcopyrite and to a lesser degree sphalerite are nominally stable in post-glacial terrains. It would seem logical, therefore, to highlight these occurrences together with more stable ore enriched phases, such as gahnites, whenever they occur.

Chalcopyrite

Probably the most significant finding of this study is the identification of an intense chalcopyrite anomaly on the Abitibi River at Coral Rapids. This anomaly can be traced downstream from Coral Rapids up to the confluence of the Abitibi and Little Abitibi rivers. The most important sample is KAP-2181 which yielded approximately 900 chalcopyrite grains. This sample was collected approximately 1 km downstream from the Valentine Township alkalic complex (Figure 26). Chalcopyrite grains also occur in other parts of the Moose River Basin in association with gahnite anomalies on Pike River north/ Mattagami River and Adam Creek/Mattagami River. An interesting anomaly also occurs in the southern part of the study area on the North French River.

Gahnite

The importance of gahnite grains recovered from modern alluvium samples cannot be overstated. Gahnites are useful simply because they serve as an indicator for Zn mineralization and are stable in oxidizing surficial environments (Morris et al. 1997b). There are essentially 3 modes of occurrence for gahnite. These include VMS (polymetallic), REE pegmatites and peraluminous granites. Compositional differences between gahnites from these various environments makes it possible to classify the mode of occurrence using electron microprobe data. Gahnites from polymettalic deposits exhibit MgO concentrations that are typically >2 wt%, whereas those from REE pegmatites and peraluminous granites tend to have MgO concentrations that are <2 wt% (Dunlop 2000, Morris et al. 1997b). It should be noted, however, that compositional overlap between these groups does exist.

A significant number of gahnite grains were recovered from samples collected in the Coral Rapids study area. The data shows that of the 182 gahnites probed, 140 have MgO concentrations >2 wt % and 42 have MgO concentrations <2 wt%. The fact that the majority of the grains are enriched in MgO suggests that the source is likely a VMS type. Figure 26 illustrates the regional distribution of both gahnites and chalcopyrites recovered in the Coral Rapids study area. The most important site is KAP-1999 which was sampled on the Mattagami River and yielded 32 gahnites and 84 chalcopyrites. Sample KAP-1979 (Adam Creek) yielded 20 gahnite, 32 chalcopyrite and approximately 20 000 pyrite grains. Sample KAP-1994 yielded 20 gahnite, 20 chalcopyrite and approximately 4000 pyrites. Other less significant anomalies occur on the Opasatika River system. It is interesting to note that most samples that yield gahnite grains also contain chalcopyrite.

Summary statistics and mineral chemistry for all gahnite grains recovered from the Coral Rapids study area are listed in Appendix E and MRD 87 (Appendix F, Ontario Geological Survey 2001d).

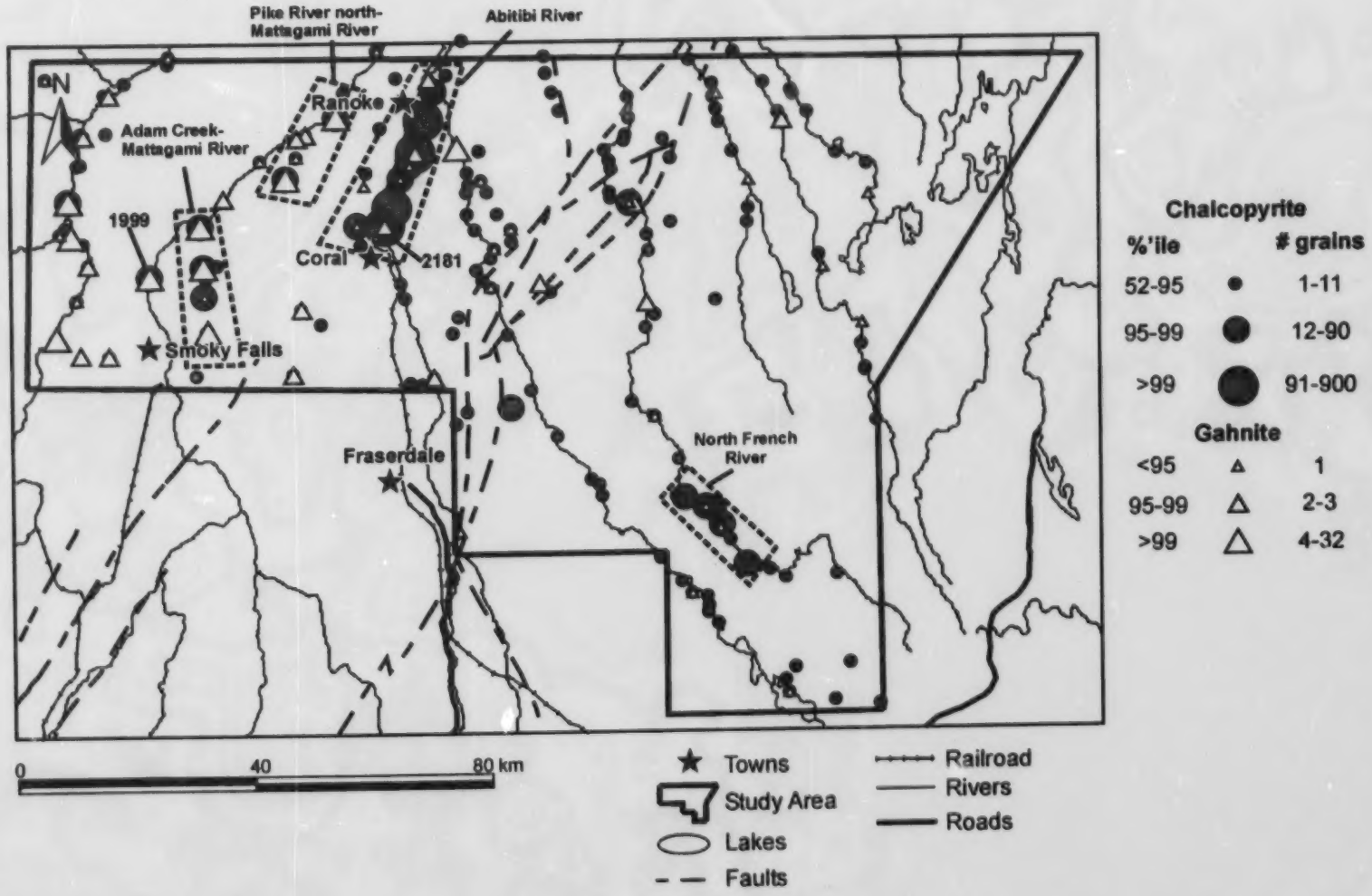


Figure 26. Regional distribution of chalcopyrite and gahnite grains in the Coral Rapids study area

Cr-Diopside

Averill (1999) has suggested that low Cr-diopsides are an important indicator mineral for magmatic Ni-Cu minerilzation with 2 notable examples of this association occurring at Thompson, Manitoba and Outokumpu, Finland. In the Coral Rapids study area, Cr-poor diopsides are a common component in the heavy mineral concentrates and are widely distributed throughout the Coral Rapids study area. In Figure 17 a total of 4 distinguishable populations of clinopyroxenes are identified for the Coral Rapids study area. If the regional distribution of the different groups of pyroxenes is considered (Figure 27) it is apparent that anomalous sites for each group occur in many different areas. It is not clear which of these groups (if any) are linked to magmatic Ni-Cu mineralization. Caution is therefore warranted against placing too much emphasis on the recovery of these types of minerals unless a known compositional trait can be used to target prospective areas. Clearly, further detailed studies of Cr-diopside compositions from known Ni-Cu deposits are required to help improve the use of this mineral as a viable MMSIM®.

Recommendations for Metamorphic/Magmatic Massive Sulphide Exploration

The identification of a very significant chalcopyrite anomaly at Coral Rapids warrants further investigation. The fact that chalcopyrite is only nominally stable in secondary environments suggests that this signature represents a local source. It is tempting to suggest that this anomaly is related to the Valentine Township alkalic complex. However, the available drill core data (Sage 1988b) indicates that the complex is overlain by a thick cover (between 120 and 150 m) of both overburden and Paleozoic rocks. As such, it would not be expected that the complex could have been subject to erosion by either glacial activity or modern alluvial processes. It is possible, however, that a separate event (post-Paleozoic) is responsible for producing the observed anomaly. What is interesting to note is that the olivine anomaly (Figure 23) and chalcopyrite anomaly described here are concurrent. That is to say, both are continuous between Coral Rapids and the confluence of the Abitibi and Little Abitibi rivers.

Important gahnite anomalies also occur on the Mattagami and Opasatika Rivers and it is suggested here that these areas warrant further investigation. In all, 4 prospective areas are highlighted in Figure 26 and listed in Table 3. This list is not intended to provide targets for specific modes of base metal occurrence (for example VMS vs. magmatic Ni-Cu) since there are no obvious trends in the data set that would suggest such links. Instead, the information provided should be used as a general guide for targeting important MMSIMs® occurrences.

It is suggested here that the reader utilise this information as a starting point for the planning of exploration activities. Other important exploration related sources of information include the numerous assessment files that are kept on record at the Mines and Minerals Library located in Sudbury and the regional Resident Geologist's Offices. These files contain important information on known mineral occurrences in the study area.

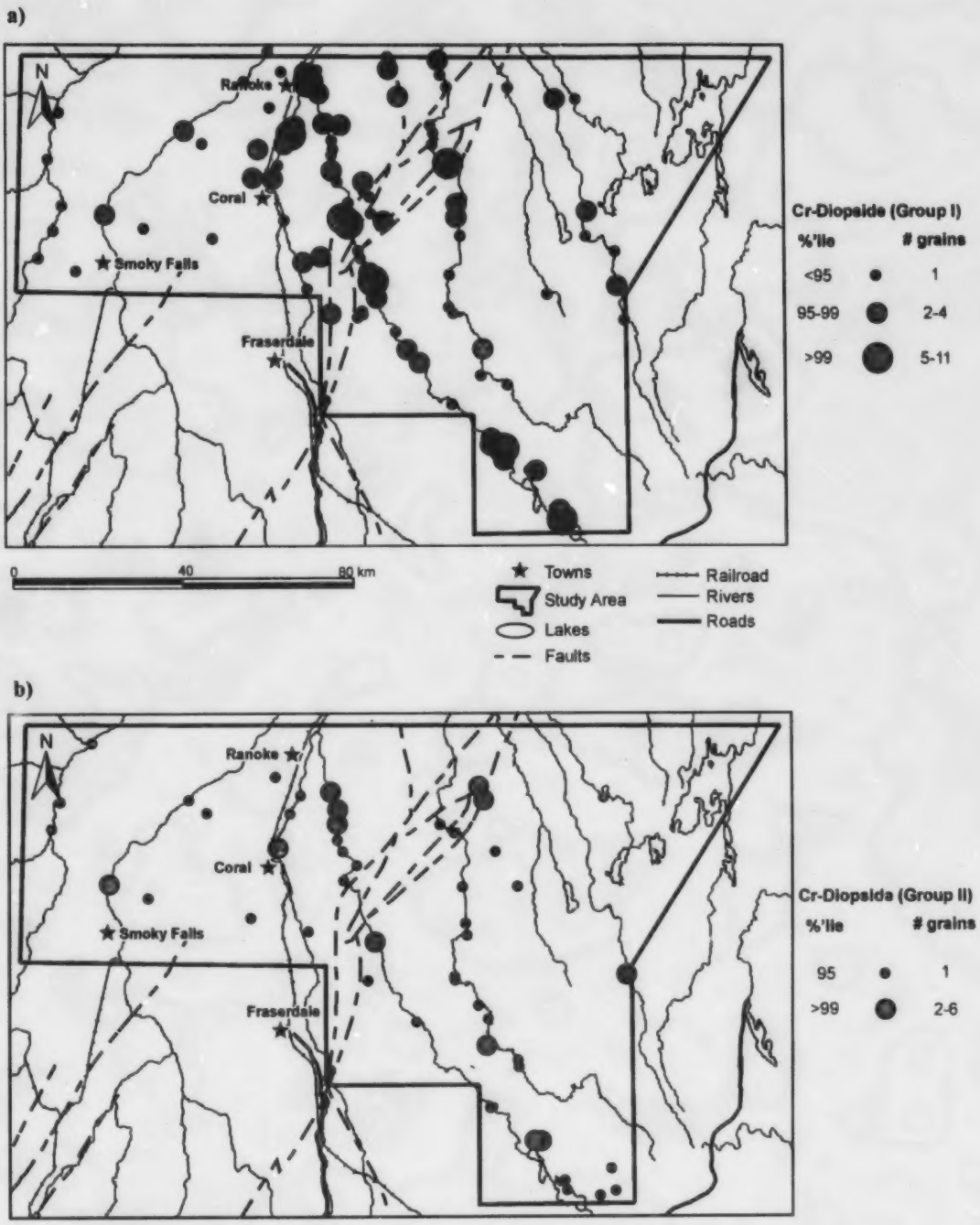


Figure 27. Regional distribution of non-KIM clinopyroxenes in the Coral Rapids study area, a) Cr-diopside (Group I), b) Cr-diopside (Group II)

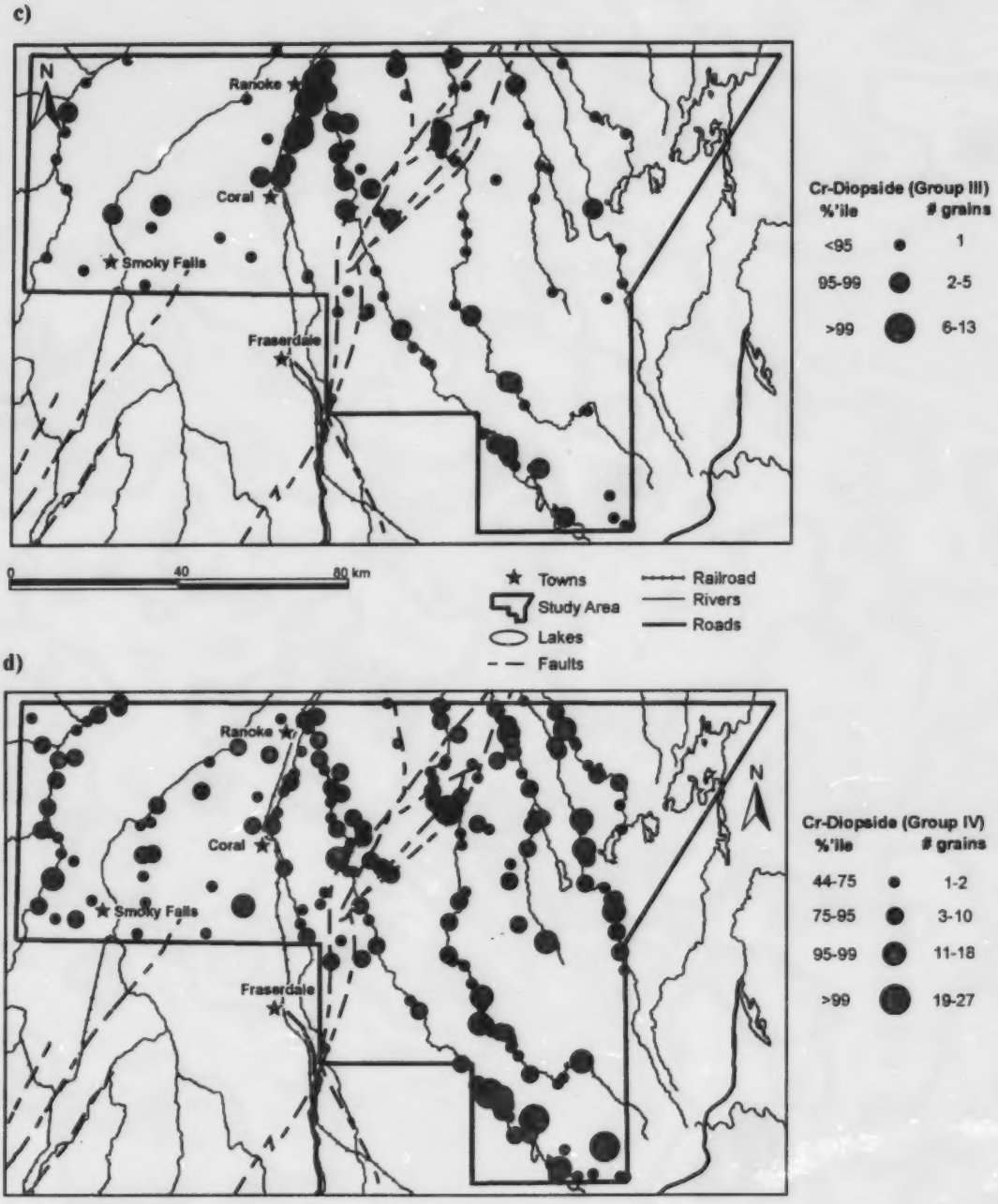


Figure 27. Regional distribution of non-KIM clinopyroxenes in the Coral Rapids study area, c) Cr-diopside (Group III), d) Cr-diopside (Group IV)

Table 3. Summary table of the samples containing the most significant numbers and types of MMSIMs® in the Coral Rapids study area. Pyrite is included in the table to emphasize the coexistence of different sulphide species in the modern alluvium samples. For a full listing of MMSIMs® the reader is refered to Appendix E.

Sample KAP	Easting	Northing	Cpy	Mol	Sphalerite	Pyr	Gahnite	Rub Cor	Saph Cor	Red Rutile
Abitibi River										
2181	452897	5566153	900	0	0	3500	2	0	0	0
2182	454147	5569265	200	0	0	2000	0	0	0	0
2183	458157	5578457	150	0	0	2000	3	0	0	0
2184	459514	5583895	100	0	0	7000	0	0	0	0
2122	455648	5574204	60	0	0	75	1	0	0	0
2123	457190	5576412	33	0	0	7	1	0	0	0
2125	461286	5588835	27	0	0	500	0	0	0	0
2124	459856	5583521	15	0	0	9000	0	0	0	1
2118	448220	5566309	12	0	0	30	1	2	0	2
Adam Creek/Mattagami River										
1999	413355	5557753	84	12	0	40	32	0	0	3
1976	422449	5554489	60	2	0	10000	1	0	0	2
1979	421881	5566345	30	0	0	20000	20	0	0	0
1978	422324	5559430	23	2	0	10000	6	1	0	0
North Pike River/Mattagami River										
1994	444815	5584596	20	0	0	4000	20	1	0	0
1940	436218	5574353	17	0	13	150	5	2	2	1
North French River										
2155	507860	5517772	23	4	0	7000	0	0	0	2
2086	506610	5518072	20	0	0	8000	1	0	0	0
2082	509341	5514995	12	1	0	50	1	0	0	0
2094	503101	5519662	12	0	0	100	0	1	1	10
2416	513531	5508281	12	0	0	25	0	1	0	0
Individual Sites										
2046	473939	5535175	18	0	0	10000	0	0	0	0
1980	399853	5570666	12	1	0	800	9	2	0	2
2252	494172	5569708	12	0	0	50	1	0	0	0

Carbonatite Indicator Minerals

Relatively few carbonatite indicator minerals were recovered from the Coral Rapids study area. This is not entirely unexpected since the Hecla-Kilmer and Valentine Township complexes are overlain by thick sequences of sedimentary cover and glacial drift. As such, no targets for carbonatite exploration can be recommended.

Gold

Gold grains recovered from modern alluvium samples are typically silt sized and vary in grain shape depending on the distance of transport from their source area. Gold grain shapes can be used to determine the transport history of the sample. Three gold grain appearances are recognised: 1) pristine; 2) modified; and 3) reshaped. In general, pristine grains indicate short transport distance from the source area and reshaped grains indicate a longer distance of transport.

Gold grains were recovered from samples throughout the study area (Appendix G). There are a few sites that are worth highlighting. Sample KAP-2122 was collected on the Abitibi River and yielded 60 gold grains. Sample KAP-1978 (Adam Creek) yielded 27 gold grains including one pristine grain and KAP-1992 (confluence of Pike River and the Mattagami River) yielded 14 gold grains. The majority of recovered gold grains are reshaped with the few exceptions highlighted in Figure 28.

Acknowledgements

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Samples were collected by W.A. Hubacheck Consultants Ltd. under contract to the OGS. Overburden Drilling Management performed the heavy mineral processing under contract to the OGS and the Geoscience Laboratories in Sudbury performed the microprobe analysis.

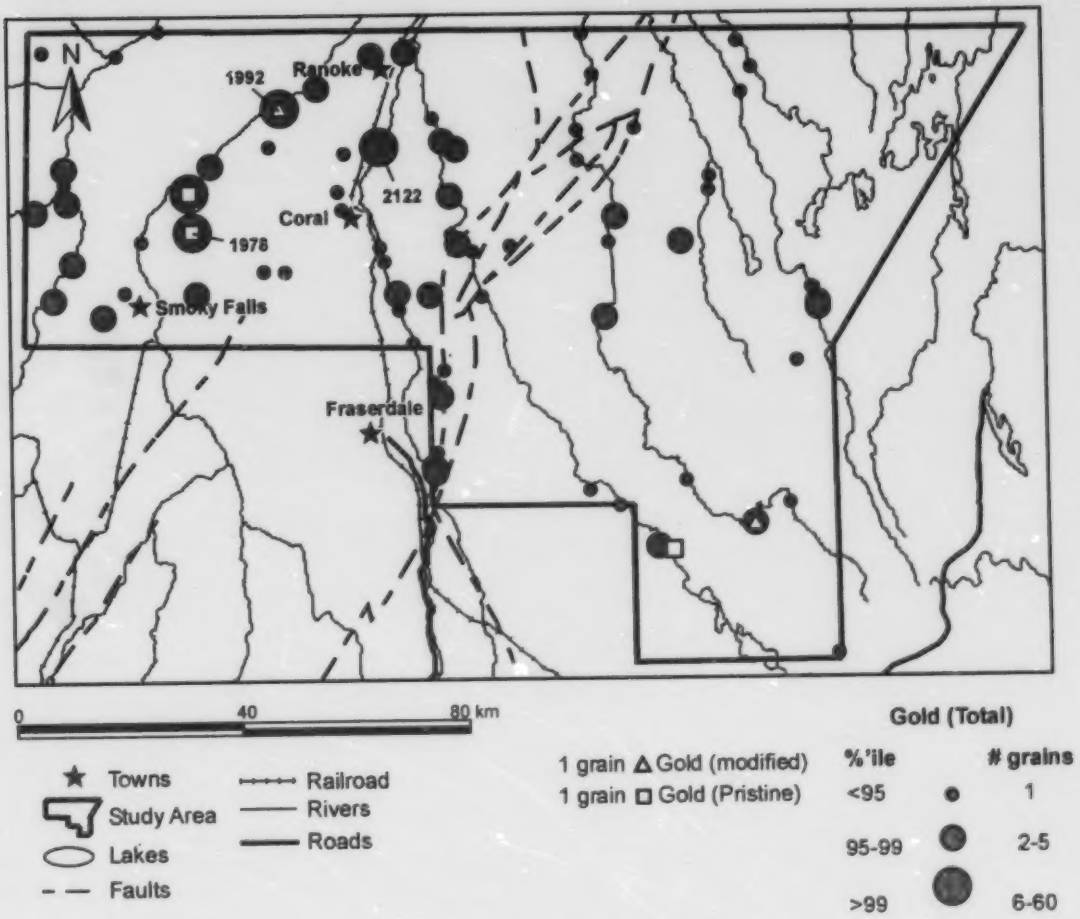

Figure 28. Regional distribution of gold grains in the Coral Rapids study area.

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APPENDIX A: Sample Locations by UTM Coordinates and Township.

Sample # KAP-	Township	UTM Grid Zone	Datum	Easting	Northing
1523	Unsurveyed	17	NAD 83	512867	5497751
1524	Swartman	17	NAD 83	519965	5488523
1530	Swartman	17	NAD 83	524642	5484443
1631	Parliament	17	NAD 83	461223	5539415
1632	Parliament	17	NAD 83	460994	5540365
1633	Parliament	17	NAD 83	459669	5541633
1634	Parliament	17	NAD 83	459377	5542612
1635	Parliament	17	NAD 83	458833	5545312
1636	Parliament	17	NAD 83	458540	5548186
1637	Parliamant	17	NAD 83	456915	5549394
1638	Pitt	17	NAD 83	456303	5553885
1648	Avon	17	NAD 83	465188	5514230
1649	Avon	17	NAD 83	464825	5516574
1650	Avon	17	NAD 83	464612	5517496
1677	Pitt	17	NAD 83	464441	5551227
1678	Parliament	17	NAD 83	465220	5550661
1679	Kineras	17	NAD 83	473015	5549327
1680	Mewhinney	17	NAD 83	468630	5534859
1681	Pinard	17	NAD 83	464751	5532531
1682	Pinard	17	NAD 83	465930	5530018
1683	Parliament	17	NAD 83	464292	5547905
1684	Parliament	17	NAD 83	459996	5546609
1685	Harewood	17	NAD 83	483066	5540303
1686	Kineras	17	NAD 83	479382	5547099
1687	Wacousta	17	NAD 83	478452	5548777
1897	Bradley	17	NAD 83	394819	5542085
1910	Bradley	17	NAD 83	406471	5544507
1911	Harmon	17	NAD 83	410355	5548807
1912	Wright	17	NAD 83	393960	5553240
1913	Acres	17	NAD 83	401918	5553108
1914	Acres	17	NAD 83	406052	5558071
1915	Acres	17	NAD 83	402302	5563570
1916	Acres	17	NAD 83	398413	5565264
1917	McCausland	17	NAD 83	399395	5566291
1922	Harmon	17	NAD 83	421055	5541086
1923	Cockshutt	17	NAD 83	423011	5548355
1924	Harmon	17	NAD 83	419954	5549411
1925	Emerson	17	NAD 83	430511	5558887
1927	McCausland	17	NAD 83	399871	5568056
1928	McCausland	17	NAD 83	399353	5571069
1929	McCausland	17	NAD 83	401893	5576994
1930	Mahoney	17	NAD 83	401955	5582145
1931	Mahoney	17	NAD 83	396177	5591422
1932	Lambert	17	NAD 83	411829	5592152
1933	Mahoney	17	NAD 83	405990	5588735
1934	Mahoney	17	NAD 83	406290	5582250
1936	Hecla	17	NAD 83	425795	5571040
1937	Hecla	17	NAD 83	432029	5577391
1938	Hogg	17	NAD 83	439838	5588640

Sample # KAP-	Township	UTM Grid Zone	Datum	Easting	Northing
1939	Hogg	17	NAD 83	446174	5588884
1940	Hecla	17	NAD 83	436218	5574353
1941	Hecla	17	NAD 83	438027	5577933
1942	Sanborn	17	NAD 83	420877	5566515
1943	Kipling	17	NAD 83	422806	5557467
1944	Emerson	17	NAD 83	435036	5552307
1961	Bradley	17	NAD 83	401666	5544566
1962	Bradley	17	NAD 83	401689	5544647
1963	Bradley	17	NAD 83	397547	5547477
1964	Bradley	17	NAD 83	397690	5547585
1965	Acres	17	NAD 83	401098	5553925
1966	Acres	17	NAD 83	401151	5553987
1967	Acres	17	NAD 83	403606	5551931
1968	Acres	17	NAD 83	403106	5559836
1969	Acres	17	NAD 83	400292	5564712
1970	Acres	17	NAD 83	394536	5563145
1974	Cockshutt	17	NAD 83	427067	5546684
1975	Harmon	17	NAD 83	422829	5548412
1976	Kipling	17	NAD 83	422449	5554489
1977	Emerson	17	NAD 83	423982	5559480
1978	Kipling	17	NAD 83	422324	5559430
1979	Sanborn	17	NAD 83	421881	5566345
1980	McCausland	17	NAD 83	399853	5570666
1981	McCausland	17	NAD 83	399836	5570680
1982	McCausland	17	NAD 83	401405	5576845
1983	Mahoney	17	NAD 83	402468	5581698
1984	Mahoney	17	NAD 83	398618	5585164
1985	Unsurveyed	17	NAD 83	416782	5595070
1986	Lambert	17	NAD 83	416628	5593876
1987	Lambert	17	NAD 83	409354	5590692
1988	Mahoney	17	NAD 83	407319	5590677
1989	Mahoney	17	NAD 83	406778	5588589
1990	Mahoney	17	NAD 83	408668	5579045
1991	Hecla	17	NAD 83	429422	5576887
1992	Hogg	17	NAD 83	438205	5581155
1993	Hogg	17	NAD 83	439651	5581691
1994	Rapley	17	NAD 83	444815	5584596
1995	Morrow	17	NAD 83	451776	5595894
1996	Hecla	17	NAD 83	434300	5569701
1997	Hecla	17	NAD 83	424245	5567059
1998	Emerson	17	NAD 83	424700	5559703
1999	Kipling	17	NAD 83	413355	5557753
2000	Hamlet	17	NAD 83	438733	5552120
2003	Cockshutt	17	NAD 83	437282	5541156
2004	Cockshutt	17	NAD 83	435729	5540763
2037	Parliament	17	NAD 83	459086	5539256
2039	Mewhinney	17	NAD 83	466633	5534563
2041	Parliament	17	NAD 83	457069	5539514
2043	Mewhinney	17	NAD 83	469593	5534222

Sample # KAP-	Township	UTM Grid Zone	Datum	Easting	Northing
2044	Mewhinney	17	NAD 83	472319	5533579
2045	Mewhinney	17	NAD 83	474077	5534369
2046	Mewhinney	17	NAD 83	473939	5535175
2047	Mewhinney	17	NAD 83	470267	5534266
2048	Mewhinney	17	NAD 83	472841	5533678
2049	Kineras	17	NAD 83	477355	5538207
2050	Maund	17	NAD 83	481721	5530323
2051	Maund	17	NAD 83	484405	5526180
2052	Maund	17	NAD 83	487363	5523030
2053	McAlpine	17	NAD 83	489214	5520199
2054	McAlpine	17	NAD 83	492147	5513357
2055	Unsurveyed	17	NAD 83	496164	5512109
2056	Unsurveyed	17	NAD 83	498950	5509544
2057	Unsurveyed	17	NAD 83	508372	5495381
2058	Unsurveyed	17	NAD 83	509697	5496613
2059	Unsurveyed	17	NAD 83	506934	5499538
2060	Unsurveyed	17	NAD 83	507088	5501291
2061	Mewhinney	17	NAD 83	478941	5533410
2062	Maund	17	NAD 83	481525	5528256
2063	Maund	17	NAD 83	485349	5525501
2064	Maund	17	NAD 83	488719	5522103
2065	McAlpine	17	NAD 83	489617	5515173
2066	McAlpine	17	NAD 83	494866	5513289
2067	Unsurveyed	17	NAD 83	497420	5510644
2068	Unsurveyed	17	NAD 83	501087	5505848
2069	Unsurveyed	17	NAD 83	508652	5498290
2070	Unsurveyed	17	NAD 83	506934	5500167
2071	Unsurveyed	17	NAD 83	506843	5502868
2072	Unsurveyed	17	NAD 83	504012	5505259
2073	Unsurveyed	17	NAD 83	502318	5505747
2074	Unsurveyed	17	NAD 83	509301	5514300
2081	Avon	17	NAD 83	465205	5520083
2082	Unsurveyed	17	NAD 83	509341	5514995
2083	Unsurveyed	17	NAD 83	509033	5516530
2084	Unsurveyed	17	NAD 83	509983	5494064
2085	Unsurveyed	17	NAD 83	506653	5518142
2086	Unsurveyed	17	NAD 83	506610	5518072
2087	Unsurveyed	17	NAD 83	504267	5503457
2088	Unsurveyed	17	NAD 83	503844	5503747
2089	Unsurveyed	17	NAD 83	502524	5505492
2090	Unsurveyed	17	NAD 83	510778	5512509
2094	Unsurveyed	17	NAD 83	503101	5519662
2095	Unsurveyed	17	NAD 83	501707	5519969
2096	Unsurveyed	17	NAD 83	502284	5523948
2097	Unsurveyed	17	NAD 83	501651	5527279
2098	Unsurveyed	17	NAD 83	498116	5533502
2099	Maund	17	NAD 83	494348	5535251
2100	Harewood	17	NAD 83	493956	5540988
2101	Kineras	17	NAD 83	475553	5544162

Sample # KAP-	Township	UTM Grid Zone	Datum	Easting	Northing
2103	Kineras	17	NAD 83	473493	5547560
2104	Wacousta	17	NAD 83	470671	5555602
2105	Wacousta	17	NAD 83	468281	5558536
2106	Hobson	17	NAD 83	454579	5590358
2107	Hogg	17	NAD 83	451493	5579407
2108	Kilmer	17	NAD 83	449465	5573011
2109	Wacousta	17	NAD 83	471315	5562100
2110	Heath	17	NAD 83	468090	5565385
2111	Valentine	17	NAD 83	466819	5568027
2112	Heath	17	NAD 83	467121	5573043
2113	Heath	17	NAD 83	469223	5573725
2114	Heath	17	NAD 83	471858	5568036
2115	Heath	17	NAD 83	474272	5563333
2116	Wacousta	17	NAD 83	476010	5558054
2117	Kilmer	17	NAD 83	449484	5572997
2118	Kilmer	17	NAD 83	448220	5566309
2119	Traill	17	NAD 83	446527	5549826
2120	Traill	17	NAD 83	446078	5547612
2121	Valentine	17	NAD 83	452831	5568080
2122	Valentine	17	NAD 83	455648	5574204
2123	Valentine	17	NAD 83	457190	5576412
2124	Hobson	17	NAD 83	459856	5583521
2125	Hobson	17	NAD 83	461286	5588835
2126	Hobson	17	NAD 83	460492	5590876
2127	Dyer	17	NAD 83	467314	5599621
2128	Hobson	17	NAD 83	463883	5586120
2129	Valentine	17	NAD 83	465193	5579205
2130	Valentine	17	NAD 83	464954	5579027
2131	Pitt	17	NAD 83	455601	5556416
2132	Parliament	17	NAD 83	459525	5543301
2133	Lewers	17	NAD 83	483954	5574831
2134	Carss	17	NAD 83	482464	5585415
2135	Ophir	17	NAD 83	480199	5591870
2136	DePencier	17	NAD 83	491966	5593994
2137	Carss	17	NAD 83	492489	5590566
2138	Carss	17	NAD 83	493734	5586833
2139	Unsurveyed	17	NAD 83	496550	5587419
2140	Carss	17	NAD 83	493330	5580379
2141	Lewers	17	NAD 83	490787	5576907
2142	Lewers	17	NAD 83	490512	5574226
2143	Harewood	17	NAD 83	494420	5543651
2144	Unsurveyed	17	NAD 83	497176	5545750
2145	Unsurveyed	17	NAD 83	496807	5548535
2146	Unsurveyed	17	NAD 83	496977	5552792
2147	Unsurveyed	17	NAD 83	496991	5554835
2148	Unsurveyed	17	NAD 83	495844	5557358
2149	Unsurveyed	17	NAD 83	497385	5561625
2153	Bourassa	17	NAD 83	479072	5511071
2154	Unsurveyed	17	NAD 83	509076	5514504

Sample # KAP-	Township	UTM Grid Zone	Datum	Easting	Northing
2155	Unsurveyed	17	NAD 83	507860	5517772
2156	Unsurveyed	17	NAD 83	504536	5518142
2157	Unsurveyed	17	NAD 83	502489	5519451
2158	Unsurveyed	17	NAD 83	502476	5518771
2159	Unsurveyed	17	NAD 83	499828	5529404
2160	Unsurveyed	17	NAD 83	495309	5534610
2161	Harewood	17	NAD 83	494336	5536057
2162	Wacousta	17	NAD 83	471957	5555521
2163	Wacousta	17	NAD 83	469340	5556829
2164	Wacousta	17	NAD 83	470775	5560576
2165	Unsurveyed	17	NAD 83	502151	5526219
2166	Wacousta	17	NAD 83	469722	5563399
2167	Heath	17	NAD 83	467168	5566188
2168	Valentine	17	NAD 83	466761	5571750
2169	Valentine	17	NAD 83	466874	5575104
2170	Heath	17	NAD 83	470197	5571792
2171	Heath	17	NAD 83	474194	5565417
2172	Wacousta	17	NAD 83	475679	5561963
2173	Wacousta	17	NAD 83	478630	5556471
2174	Hobson	17	NAD 83	454985	5591170
2175	Hogg	17	NAD 83	452249	5582787
2176	Kilmer	17	NAD 83	449810	5575205
2177	Kilmer	17	NAD 83	448861	5568957
2178	Kineras	17	NAD 83	476467	5542175
2179	Kilmer	17	NAD 83	448893	5563064
2180	Traill	17	NAD 83	441996	5549633
2181	Valentine	17	NAD 83	452897	5566153
2182	Valentine	17	NAD 83	454147	5569265
2183	Valentine	17	NAD 83	458157	5578457
2184	Hobson	17	NAD 83	459514	5583895
2185	Dyer	17	NAD 83	466125	5597482
2186	Hobson	17	NAD 83	463465	5591618
2187	Hobson	17	NAD 83	463974	5581743
2188	Heath	17	NAD 83	468891	5578759
2189	Pitt	17	NAD 83	456739	5550887
2190	Carss	17	NAD 83	482060	5581525
2191	Ophir	17	NAD 83	481251	5588500
2192	Dyer	17	NAD 83	479988	5594724
2193	Unsurveyed	17	NAD 83	493477	5594050
2194	DePencier	17	NAD 83	493967	5587702
2195	Carss	17	NAD 83	494182	5584121
2196	Carss	17	NAD 83	493606	5581269
2197	Carss	17	NAD 83	490038	5578762
2198	Lewers	17	NAD 83	491133	5575508
2199	Harewood	17	NAD 83	493944	5543328
2200	Harewood	17	NAD 83	495232	5543858
2201	Unsurveyed	17	NAD 83	496926	5547699
2202	Unsurveyed	17	NAD 83	498323	5550745
2203	Unsurveyed	17	NAD 83	498434	5552419

Sample # KAP-	Township	UTM Grid Zone	Datum	Easting	Northing
2204	Unsurveyed	17	NAD 83	496104	5557082
2205	Unsurveyed	17	NAD 83	496139	5560267
2206	Unsurveyed	17	NAD 83	497244	5563807
2207	Lewers	17	NAD 83	495178	5569536
2208	Lewers	17	NAD 83	491031	5570637
2209	Unsurveyed	17	NAD 83	511911	5595221
2210	Unsurveyed	17	NAD 83	516912	5589990
2211	Unsurveyed	17	NAD 83	516753	5589118
2212	Unsurveyed	17	NAD 83	519354	5584853
2213	Unsurveyed	17	NAD 83	520026	5583531
2214	Unsurveyed	17	NAD 83	520415	5579867
2215	Unsurveyed	17	NAD 83	520250	5577305
2216	Unsurveyed	17	NAD 83	520885	5575938
2217	Unsurveyed	17	NAD 83	525561	5567412
2218	Unsurveyed	17	NAD 83	526074	5566365
2219	Unsurveyed	17	NAD 83	525651	5565139
2220	Unsurveyed	17	NAD 83	519435	5592578
2221	Unsurveyed	17	NAD 83	521563	5588590
2222	Unsurveyed	17	NAD 83	521900	5587894
2223	Unsurveyed	17	NAD 83	523864	5585555
2224	Unsurveyed	17	NAD 83	524288	5584860
2225	Unsurveyed	17	NAD 83	527047	5580070
2226	Unsurveyed	17	NAD 83	529079	5577938
2227	Unsurveyed	17	NAD 83	534209	5576092
2228	Unsurveyed	17	NAD 83	535724	5573701
2229	Unsurveyed	17	NAD 83	534530	5570826
2230	Unsurveyed	17	NAD 83	535026	5565198
2231	Unsurveyed	17	NAD 83	526116	5560640
2232	Unsurveyed	17	NAD 83	526719	5558479
2233	Unsurveyed	17	NAD 83	501096	5577285
2234	Unsurveyed	17	NAD 83	499895	5580520
2235	Unsurveyed	17	NAD 83	504353	5593936
2236	Unsurveyed	17	NAD 83	505245	5593415
2237	Unsurveyed	17	NAD 83	506479	5591131
2238	Unsurveyed	17	NAD 83	508230	5589799
2239	Unsurveyed	17	NAD 83	508963	5588090
2240	Unsurveyed	17	NAD 83	508362	5587560
2241	Unsurveyed	17	NAD 83	508904	5585493
2242	Unsurveyed	17	NAD 83	509322	5583329
2243	Unsurveyed	17	NAD 83	511537	5578316
2245	Unsurveyed	17	NAD 83	513304	5574741
2246	Unsurveyed	17	NAD 83	514292	5573479
2247	Unsurveyed	17	NAD 83	514247	5568668
2248	Unsurveyed	17	NAD 83	514032	5566247
2249	Unsurveyed	17	NAD 83	512882	5560827
2250	Unsurveyed	17	NAD 83	505720	5581281
2251	Unsurveyed	17	NAD 83	497096	5564354
2252	Lewers	17	NAD 83	494172	5569708
2264	Swartman	17	NAD 83	514179	5487239

Sample # KAP-	Township	UTM Grid Zone	Datum	Easting	Northing
2265	McQuibban	17	NAD 83	527957	5483816
2266	McQuibban	17	NAD 83	534594	5484358
2267	McQuibban	17	NAD 83	535820	5484321
2270	Unsurveyed	17	NAD 83	526374	5552670
2271	Unsurveyed	17	NAD 83	529998	5551553
2272	Unsurveyed	17	NAD 83	530929	5551574
2273	Unsurveyed	17	NAD 83	533407	5548348
2274	Unsurveyed	17	NAD 83	533292	5548953
2275	Unsurveyed	17	NAD 83	531963	5548912
2276	Unsurveyed	17	NAD 83	533681	5540952
2277	Unsurveyed	17	NAD 83	533716	5540948
2278	Unsurveyed	17	NAD 83	533133	5546165
2279	Unsurveyed	17	NAD 83	533140	5545388
2280	Unsurveyed	17	NAD 83	533749	5541315
2281	Unsurveyed	17	NAD 83	534533	5536570
2282	Unsurveyed	17	NAD 83	535356	5532881
2283	Unsurveyed	17	NAD 83	535588	5532389
2291	Unsurveyed	17	NAD 83	516297	5567792
2292	Unsurveyed	17	NAD 83	515107	5543193
2293	Unsurveyed	17	NAD 83	517309	5539010
2294	Unsurveyed	17	NAD 83	523038	5540141
2295	Unsurveyed	17	NAD 83	510797	5543107
2296	Unsurveyed	17	NAD 83	508556	5553197
2297	Unsurveyed	17	NAD 83	508948	5557168
2298	Unsurveyed	17	NAD 83	503829	5565287
2299	Unsurveyed	17	NAD 83	501131	5566491
2300	Unsurveyed	17	NAD 83	497125	5572995
2301	Lewers	17	NAD 83	490871	5571579
2302	Wacousta	17	NAD 83	479006	5556209
2303	Wacousta	17	NAD 83	479094	5556201
2304	Ganong	17	NAD 83	480805	5554778
2305	Ganong	17	NAD 83	483236	5551268
2306	Kineras	17	NAD 83	469032	5539409
2335	McQuibban	17	NAD 83	530862	5491313
2336	McQuibban	17	NAD 83	531895	5486133
2337	Swartman	17	NAD 83	510424	5483477
2344	Unsurveyed	17	NAD 83	512677	5575236
2349	Unsurveyed	17	NAD 83	517392	5507387
2350	Unsurveyed	17	NAD 83	527591	5531414
2351	Unsurveyed	17	NAD 83	529159	5535932
2352	Unsurveyed	17	NAD 83	530043	5537443
2353	Unsurveyed	17	NAD 83	525625	5511154
2354	Unsurveyed	17	NAD 83	527572	5510988
2355	Unsurveyed	17	NAD 83	528677	5506452
2356	Unsurveyed	17	NAD 83	529770	5504584
2357	Unsurveyed	17	NAD 83	532433	5502860
2360	Sangster	17	NAD 83	527673	5476199
2401	Unsurveyed	17	NAD 83	511329	5498566
2402	McQuibban	17	NAD 83	514432	5497685

Sample # KAP-	Township	UTM Grid Zone	Datum	Easting	Northing
2403	Swartman	17	NAD 83	521647	5490659
2404	McQuibban	17	NAD 83	528232	5485016
2406	Swartman	17	NAD 83	514906	5486860
2407	Swartman	17	NAD 83	520456	5486313
2408	McQuibban	17	NAD 83	523661	5483578
2414	Unsurveyed	17	NAD 83	508968	5489862
2415	Unsurveyed	17	NAD 83	513283	5494244
2416	Unsurveyed	17	NAD 83	513531	5508281
2417	Unsurveyed	17	NAD 83	521316	5507397
2418	Unsurveyed	17	NAD 83	520058	5506026
2419	Unsurveyed	17	NAD 83	524351	5501224

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APPENDIX B: Summary Counts of Picked and Estimated Numbers of Kimberlite Indicator Mineral Grains.

This Appendix represents information provided by Overburden Drilling Management. As such, it is a compilation of types and numbers of KIM grains picked from various particle size fractions. The information here may not accurately represent the actual probed number of grains presented in Appendix C. However, the estimated versus picked grain counts supplied here are used to normalise data (where applicable).

Summary of Abbreviations

CR: Chromite
DC: Cr-diopside
FO: Forsteritic olivine
GO: Eclogitic Garnet
GP: Cr-pyrope garnet
IM: Ilmenite
KIMs: Kimberlite Indicator Minerals

*** Numbers in brackets are estimated total indicator grains present in samples where not all of the grains were picked.

Sample #	Selected PseudoKIMs			KIM Count (* species not rigorously picked; excluded from total)																			Total KIMs
	1.0-2.0 mm	0.5-1.0 mm	0.25-0.5mm	1.0 to 2.0 mm						0.5 to 1.0 mm						0.25 to 0.5 mm							
	Low-Cr diopside	Low-Cr diopside	Low-Cr diopside	GP	GO	DC	IM	CR	FO	GP	GO	DC	IM	CR	FO	GP	GO	DC	IM	CR	FO		
1523	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33(45)	0	45	
1524	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	
1530	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1631	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	0	11	
1632	0	0	6	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	21(60)	0	81	
1633	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	4	
1634	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1635	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1636	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	7	
1637	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9(20)	0	20	
1638	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	15(30)	0	32	
1648	0	1	3	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	
1649	No sample	0	0	No sample						0	0	0	0	0	0	0	0	0	0	0	0	0	
1650	No sample	0	0	No sample						0	0	0	0	0	0	0	0	0	0	0	0	0	
1677	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1678	No sample	0	2	No sample						0	0	0	0	0	0	0	0	0	0	0	0	0	
1679	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	8	
1680	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1681	No sample	0	0	No sample						0	0	0	0	0	0	0	0	0	0	0	0	0	
1682	No sample	0	0	No sample						0	0	0	0	0	0	0	0	0	0	0	0	0	
1683	0	0	3	0	0	0	0	0	0	1	1	0	3	6	0	0	1	0	0	30(100)	0	111	
1684	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	
1685	No sample	0	0	No sample						0	0	0	0	0	0	0	0	0	0	0	0	0	
1686	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	6	
1687	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1897	0	0	1	0	0	0	0	0	0	1	0	0	3	0	0	0	0	0	2(10)	8(25)	0	28	
1910	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	1	29(100)	1	103	
1911	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	4	0	5	
1912	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2	6	0	8	
1913	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	
1914	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1915	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	2	0	2	
1916	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	8	0	9	
1917	0	0	2	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	2	7	0	9	
1922	0	0	3	0	0	0	0	0	0	0	0	0	3	0	0	1	0	0	3	10(20)	0	74	
1923	0	0	2	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	3(10)	45(200)	0	202	
1924	No sample	No sample	0	No sample						No sample						0	0	0	0	0	0	0	
1925	No sample	No sample	0	No sample						No sample						0	0	0	0	0	0	0	
1927	0	0	0	1	0	0	1	0	0	0	0	0	8	2	0	0	3	0	2	12(20)	0	32	
1928	No sample	0	0	No sample						0	0	0	0	0	0	0	0	0	0	0	0	0	
1929	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1930	0	0	0	0	0	0	0	0	0	0	0	0	10	14	0	0	0	0	1	29(100)	0	124	
1931	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	
1932	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	
1933	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	0	3	
1934	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7(15)	0	15	
1936	0	0	3	0	0	0	0	0	0	0	0	0	2	4	0	0	0	0	0	30(200)	1	206	
1937	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	15(30)	0	30	
1938	No sample	No sample	0	No sample						No sample						0	0	0	0	0	0	0	
1939	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	15(30)	0	32	
1940	0	0	5	0	0	0	0	0	0	0	0	0	1	1	0	2	0	0	0	40(100)	1	104	
1941	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	6(15)	0	16	
1942	0	0	1	0	0	0	0	0	0	0	1	0	0	3	0	0	1	0	0	7(15)	0	19	
1943	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	8	
1944	No sample	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1961	0	0	2	0	0	0	4	0	0	0	0	0	16	1	0	1	2	0	7(15)	2	2	28	
1962	0	0	1	0	0	0	1	0	0	0	0	0	45	13	0	0	0	0	8(80)	30(50)	0	109	
1963	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	10(20)	0	21	
1964	0	0	5	0	0	0	0	0	0	0	0	0	7	2	0	6	0	1	3	22(60)	5	76	
1965	0	0	15	0	0	0	0	0	0	0	0	0	8	5	1	5	0	0	1(10)	25(100)	0	118	
1966	0	0	0	0	0	0	0	0	0	0	0	0	3	1	0	1	0	0	7(15)	25(50)	0	55	
1967	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	2	
1968	0	0	0	0	0	0	1	0	0	0	0	0	30	3	0	3	1	2	3(15)	20(40)	0	79	
1969	0	0	0	0	0	0	0	0	0	4	0	1	18	7	0	2	4	1	14(50	45(200)	1	233	
1970	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1974	No sample	0	0	No sample						0	0	0	0	0	0	0	0	0	0	0	0	0	
1975	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	22(40)	0	42	
1976	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10(20)	0	20	
1977	No sample	No sample	0	No sample						No sample						0	0	0	0	0	0	0	
1978	0	0	4	0	0	0	0	0	0	1	0	0	2	1	0	0	0	0	2(20)	50(1200)	0	1204	

Sample #	Selected PseudoKimb			Kimb Count (* species not rigerously picked; excluded from total)																		Total Kimbs
	1.0-2.0 mm	0.5-1.0 mm	0.25-0.5mm	1.0 to 2.0 mm						0.5 to 1.0 mm						0.25 to 0.5 mm						
	Low-Cr diopside	Low-Cr diopside	Low-Cr diopside	GP	GO	DC	IM	CR	FO	GP	GO	DC	IM	CR	FO	GP	GO	DC	IM	CR	FO	
1979	0	0	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	30(1000)	0	1002
1980	0	0	9	0	0	0	0	0	0	0	0	0	1	0	0	3	0	0	0	20(200)	0	204
1981	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	2(10)	14(20)	0	22
1982	0	0	0	0	0	0	1	0	0	0	0	0	7	3	0	0	0	0	3(15)	20(60)	0	71
1983	0	0	9	0	0	0	0	0	0	0	0	0	2	1	0	4	0	0	2(10)	10(30)	0	37
1984	0	0	3	0	0	0	0	0	0	0	0	0	3	1	0	2	0	0	4(20)	9(25)	0	31
1985	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	19(40)	0	41
1986	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3
1987	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1988	No sample	0	0	No sample						0	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6(15)	0	15
1990	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	2	0	1	0	1	1	0	0	0	0	9	14	0	1	0	0	7(20)	50(150)	0	177
1993	0	0	0	0	0	0	0	1	0	0	0	0	3	5	0	1	0	0	0	45(300)	0	310
1994	0	0	4	0	0	0	0	0	0	0	0	0	5	3	0	1	0	0	0	25(600)	0	609
1995	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	17	0	18
1996	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	3	0	5
1997	0	0	2	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	35(150)	0	152
1998	0	0	6	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	18(40)	0	44
1999	0	0	7	0	0	0	0	0	0	0	0	0	35	8	0	1	0	0	1(30)	62(300)	0	344
2000	0	1	2	0	0	0	0	0	0	0	0	0	5	0	0	1	0	1	4(20)	25(50)	0	57
2003	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	4(15)	10(25)	0	25
2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2037	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2039	0	1	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4(10)	0	10
2041	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	4	0	5
2043	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2044	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	4
2045	No sample	0	6	No sample						0	0	0	0	0	0	0	0	0	0	0	0	0
2046	0	1	7	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	20(80)	0	82
2047	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2048	0	0	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	8	0	9
2049	0	0	7	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	5(10)	0	11
2050	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20(30)	0	30
2051	0	0	3	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	15(25)	0	27
2052	0	1	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4(10)	0	10
2053	0	0	1	0	0	0	0	0	0	0	0	0	1	3	0	0	1	0	0	23(40)	0	44
2054	No sample	No sample	0	No sample						No sample						0	0	0	0	0	0	0
2055	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2056	0	0	0	0	0	0	0	0	0	1	0	0	0	10(15)	0	0	0	0	0	50(200)	0	216
2057	No sample	0	0	No sample						0	0	0	0	0	0	0	0	0	0	0	0	0
2058	No sample	No sample	0	No sample						No sample						0	0	0	0	0	0	0
2059	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2
2060	0	0	18	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	50(100)	0	103
2061	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2062	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	7
2063	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2064	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	1	0	2	0	35(80)	0	87
2065	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2066	0	0	1	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	20(30)	0	37
2067	0	0	3	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	25(125)	0	128
2068	0	0	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2069	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3
2070	0	1	6	0	0	0	0	0	0	0	0	0	3	33	0	1	0	0	0	50(500)	0	537
2071	0	1	20	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	35	0	43
2072	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8(20)	0	20
2073	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2074	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	15(25)	0	26
2081	No sample	0	0	No sample						0	0	0	0	0	0	0	0	0	0	0	0	0
2082	0	0	3	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	25(125)	0	132
2083	0	0	4	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	35(125)	0	132
2084	0	0	6	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	19(40)	0	41
2085	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2086	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	65(250)	0	250
2087	0	1	3	0	0	0	0	0	0	0	0	0	0	7	0	1	0	0	0	20(500)	0	508
2088	0	0	35(50)	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	24(40)	0	44
2089	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
2090	0	0	4	0	0	0	0	0	0	0	0	0	1	3	0	0	0	0	0	20(300)	0	304
2094	0	0	3	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	31(300)	0	302

Sample #	Selected Pseudo-Kills			Kill Count (* species not rigorously picked; excluded from total)																			Total Kills
	1.0-2.0 mm	0.5-1.0 mm	0.25-0.5mm	1.0 to 2.0 mm						0.5 to 1.0 mm						0.25 to 0.5 mm							
	Low-Cr diopside	Low-Cr diopside	Low-Cr diopside	GP	GO	DC	IM	CR	FO	GP	GO	DC	IM	CR	FO	GP	GO	DC	IM	CR	FO		
2095	0	0	23	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	18(30)	0	32
2096	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2097	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2
2098	0	0	3	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	20(80)	0	81
2099	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2100	No sample	0	0	No sample						0	0	0	0	0	0	0	0	0	0	0	0	0
2101	0	0	7	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	30(100)	0	102
2103	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10(30)	0	30
2104	0	1	13	0	0	0	0	0	0	0	0	0	0	2	1	1	0	0	0	20(150)	0	153
2105	0	0	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	0	13
2106	0	0	0	0	0	0	0	0	0	0	0	0	3	1	0	0	0	0	1(5)	11(15)	0	19
2107	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2108	0	0	3	0	0	0	0	0	0	0	0	0	2	1	1	0	0	0	0	20(40)	0	43
2109	0	0	3	0	0	0	0	0	0	0	0	0	0	II	0	1	0	0	0	21(100)	0	100
2110	0	1	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22(30)	0	30
2111	0	0	5	0	0	0	0	0	0	1	0	0	5	18	0	0	0	0	0	20(150)	0	174
2112	0	1	3	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	10(20)	0	21
2113	0	1	5	0	0	0	0	0	0	1	0	0	0	4	0	1	0	0	0	20(250)	0	256
2114	0	1	6	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	31(40)	0	41
2115	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	17(50)	0	50
2116	0	0	17	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
2117	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	23(40)	0	42
2118	0	1	10	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	17(80)	0	82
2119	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2120	0	0	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2121	0	0	0	0	0	0	1	0	1	2	0	0	7	8	1	1	0	0	7(15)	20(50)	30(75)	69
2122	0	2	7	0	0	0	0	0	0	1	0	0	18(50)	43(100)	25(150)	0	0	0	1	21(3000)	25(2000)	3151
2123	0	1	20	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	25(300)	0
2124	0	0	1	0	0	0	0	0	0	1	0	0	0	3	17	0	0	0	0	8(20)	20(80)	24
2125	0	0	20	0	0	0	0	0	0	0	0	0	0	0	25(80)	0	0	0	0	2	25(5000)	2
2126	0	0	5	0	0	0	0	0	1	0	0	0	0	0	20(50)	0	0	0	1	23(100)	30(2000)	100
2127	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	9	8	9
2128	0	1	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14(20)	0	20
2129	0	0	9	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	20(70)	0	71
2130	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	11(20)	0	21
2131	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2132	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
2133	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2134	0	1	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3(5)	0	5
2135	0	0	7	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	7	0	9
2136	0	1	6	0	0	0	0	0	0	1	0	0	0	9	0	0	0	0	0	20(150)	0	160
2137	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0	3
2138	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2
2139	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2140	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11(50)	0	50
2141	0	0	5	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	20(60)	0	63
2142	0	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9(15)	0	15
2143	0	0	5	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	20(50)	0	52
2144	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
2145	1	4	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17(30)	0	30
2146	0	0	2	0	0	0	0	0	0	0	0	0	0	4	0	1	0	0	0	20(400)	0	405
2147	No sample	0	0	No sample						0	0	0	0	0	0	0	0	0	0	0	0	0
2148	No sample	0	0	No sample						0	0	0	0	0	0	0	0	0	0	0	0	0
2149	0	0	3	0	0	0	0	0	0	1	0	0	0	5	0	1	0	0	0	20(200)	0	207
2153	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2154	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40(250)	0	250
2155	0	0	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40(300)	0	300
2156	0	0	1	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	20(200)	0	205
2157	No sample	0	1	No sample						0	0	0	0	0	0	0	0	0	0	0	0	0
2158	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2159	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	9
2160	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2161	0	0	6	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	25(100)	0	105
2162	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2163	0	0	9	0	0	0	0	0	0	1	0	0	0	3(10)	0	0	0	0	0	25(1000)	0	1011
2164	0	0	2	0	0	0	0	0	0	1	0	0	0	7	0	0	0	0	0	24(40)	0	48
2165	0	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40(75)	0	75
2166	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
2167	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20(60)	0	60
2168	0	0	6	0	0	0	1	0	0	1	0	0	0	5(10)	0	0	0	0	0	30(500)	0	512

Sample #	Selected Pseudo/Klifs			Klifs Count (* species not rigorously picked; excluded from total)																			
	1.0-2.0 mm	0.5-1.0 mm	0.25-0.5mm	1.0 to 2.0 mm						0.5 to 1.0 mm						0.25 to 0.5 mm						Total Klifs
	Low-Cr diopside	Low-Cr diopside	Low-Cr diopside	GP	GO	DC	IM	CR	FO	GP	GO	DC	IM	CR	FO	GP	GO	DC	IM	CR	FO	
2169	0	0	5	0	0	0	0	0	0	1	0	0	3	4	0	1	3	0	2(10)	22(50)	0	59
2170	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2171	0	1	4	0	0	0	0	0	0	0	0	0	0	2(4)	0	0	0	0	0	20(80)	0	84
2172	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2173	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20(200)	0	200
2174	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10(30)	2	30
2175	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2176	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	6(15)	0	16
2177	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	8(15)	0	17
2178	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	0	16
2179	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	1	25(30)	0	32
2180	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3
2181	0	1	13	0	0	0	0	0	0	0	0	0	0	1	20(200)	3	0	0	0	1	20(2000)	5
2182	0	0	7	0	0	0	0	0	0	0	0	0	1	0	10(300)	0	0	0	0	10(30)	20(3000)	31
2183	0	0	7	0	0	0	0	0	0	2	0	0	0	0	15(150)	0	0	0	0	10(150)	15(5000)	152
2184	0	0	5	0	0	0	0	0	0	0	0	0	0	0	20(30)	0	0	0	0	5(30)	10(3000)	30
2185	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	9	2
2186	0	1	6	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	20(50)	0	54
2187	0	0	4	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	10	1	11
2188	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	5(20)	0	21
2189	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2190	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2
2191	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	3	0	4
2192	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
2193	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2194	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	20(125)	0	126
2195	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	10(30)	0	32
2196	0	0	2	0	0	0	0	0	0	0	0	0	1	6	0	1	0	0	0	50(250)	0	256
2197	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0	12
2198	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	10(60)	0	61
2199	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2200	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2
2201	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
2202	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2203	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2204	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10(20)	0	20
2205	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2206	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	9
2207	0	0	5	0	0	0	0	0	0	0	0	0	0	7	0	2	0	0	0	20(300)	0	309
2208	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	10(20)	0	21
2209	0	0	1	0	0	0	0	0	0	1	0	0	0	3	0	0	0	0	0	50(500)	0	504
2210	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
2211	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2212	0	0	6	0	0	0	0	0	0	0	0	0	0	6	0	1	0	0	0	20(300)	0	307
2213	0	0	7	0	0	0	0	0	0	0	0	0	0	17	0	0	0	0	0	20(400)	0	417
2214	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	9
2215	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10(15)	0	15
2216	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	0	18
2217	0	0	12	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	35(250)	0	252
2218	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	5
2219	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20(150)	0	150
2220	0	0	5	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	0	30(300)	0	303
2221	0	0	14	0	0	0	0	0	0	0	0	0	0	3	0	1	0	0	0	25(300)	0	304
2222	0	0	1	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	30(300)	0	307
2223	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15(25)	0	25
2224	0	0	2	0	0	0	0	0	0	0	0	0	0	3	0	1	0	0	0	20(150)	0	154
2225	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	8	0	9
2226	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20(40)	0	40
2227	0	0	6	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	10(25)	0	27
2228	No sample	No sample	0	No sample						No sample						0	0	0	0	0	0	0
2229	0	0	1	0	0	0	0	2	0	0	0	0	0	14	0	0	0	0	0	30(400)	0	414
2230	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	0	11
2231	0	0	13	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	7	0	8
2232	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50(100)	0	100
2233	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	10
2234	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2
2235	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10(15)	0	15
2236	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	10(20)	0	21
2237	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20(80)	0	80
2238	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	8

Sample #	Selected PseudoKillis			Kill Count (* species not rigorously picked; excluded from total)																			Total Killis
	1.0-2.0 mm	0.5-1.0 mm	0.25-0.5mm	1.0 to 2.0 mm						0.5 to 1.0 mm						0.25 to 0.5 mm							
	Low-Cr diopside	Low-Cr diopside	Low-Cr diopside	GP	GO	DC	IM	CR	FO	GP	GO	DC	IM	CR	FO	GP	GO	DC	IM	CR	FO		
			***											***	***	***				***	***	***	
2239	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	8	
2240	0	0	20	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	40(150)	0	157	
2241	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20(40)	0	40	
2242	0	0	5	0	0	0	0	0	0	0	0	0	0	8	0	1	0	1	0	25(200)	0	210	
2243	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20(100)	0	100	
2245	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	11	0	12	
2246	No sample	0	0	No sample						0	0	0	0	0	0	0	0	0	0	0	0	0	
2247	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20(40)	0	40	
2248	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40(150)	0	150	
2249	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0	14	
2250	No sample	0	11	No sample						0	0	0	0	0	0	0	0	0	0	1	0	1	
2251	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	9	
2252	0	0	29	0	0	0	0	0	0	1	0	0	0	7(15)	0	3	0	0	0	16(50)	0	69	
2264	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
2265	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
2266	0	0	2	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	25(200)	0	202	
2267	0	0	3	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	20(200)	0	201	
2270	0	0	4	0	0	0	0	0	0	0	0	0	1	27	0	1	0	0	0	60(400)	0	429	
2271	No sample	0	0	No sample						0	0	0	0	0	0	0	0	0	0	0	0	0	
2272	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	20(30)	0	31	
2273	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3	
2274	0	0	10	0	0	0	0	0	0	0	0	0	0	3	0	1	0	0	0	45(100)	0	104	
2275	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
2276	0	0	3	0	0	0	0	0	0	1	0	0	2	28	0	1	0	0	0	20(800)	0	832	
2277	0	0	2	0	0	0	0	0	0	2	0	0	0	21	0	0	0	0	0	40(500)	0	523	
2278	0	0	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3	
2279	0	1	1	0	0	0	0	0	0	0	0	0	2	17	0	0	0	0	0	20(300)	0	319	
2280	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	9	
2281	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	4	
2282	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	6	
2283	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
2291	No sample	0	7	No sample						0	0	0	0	0	0	0	0	0	0	1	0	1	
2292	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20(40)	0	40	
2293	0	0	18	0	0	0	0	0	0	2	0	0	0	0	0	2	0	0	0	10(20)	0	24	
2294	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3	
2295	0	0	4	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	2	0	4	
2296	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15(40)	0	40	
2297	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	
2298	No sample	0	4	No sample						0	0	0	0	0	0	0	0	0	0	0	0	0	
2299	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12(20)	0	20	
2300	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
2301	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3	
2302	0	0	7	0	0	0	0	0	0	1	1	0	0	7	0	2	0	0	0	32(800)	0	611	
2303	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	15(40)	0	41	
2304	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	3	0	4	
2305	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	
2306	No sample	0	3	No sample						0	0	0	0	0	0	0	0	0	0	0	0	0	
2335	0	0	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27	0	27	
2336	No sample	0	2	No sample						0	0	0	0	0	0	0	0	0	0	1	0	1	
2337	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	
2344	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	
2349	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0	3	
2350	No sample	No sample	0	No sample						No sample						0	0	0	0	0	0	0	
2351	No sample	No sample	0	No sample						No sample						0	0	0	0	0	0	0	
2352	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
2353	0	0	17	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	53(100)	0	105	
2354	No sample	0	0	No sample						0	0	0	0	0	0	0	0	0	0	0	0	0	
2355	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	5	
2356	No sample	No sample	0	No sample						No sample						0	0	0	0	0	0	0	
2357	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	
2360	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	
2401	No sample	0	0	No sample						0	0	0	0	0	0	0	0	0	0	0	0	0	
2402	0	0	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	0	14	
2403	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
2404	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20(80)	0	80	
2406	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
2407	0	2	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	4	
2408	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
2414	No sample	No sample	0	No sample						No sample						0	0	0	0	0	0	0	
2415	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	

Sample #	Selected PseudoKIMs			KIM Count (* species not rigorously picked; excluded from total)																		Total KIMs
	1.0-2.0 mm	0.5-1.0 mm	0.25-0.5mm	1.0 to 2.0 mm						0.5 to 1.0 mm						0.25 to 0.5 mm						
	Low-Cr diopside	Low-Cr diopside	Low-Cr diopside	GP	GO	DC	IM	CR	FO	GP	GO	DC	IM	CR	FO	GP	GO	DC	IM	CR	FO	
2416	0	1	7	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	20(250)	0	252
2417	No sample	0	1	No sample						0	0	0	0	0	0	0	0	0	0	0	0	0
2418	0	0	3	0	0	0	0	0	0	0	0	0	0	12	0	1	0	0	0	20(250)	0	283
2419	No sample	No sample	0	No sample						No sample						0	0	0	0	0	0	0

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APPENDIX C: Kimberlite Indicator Minerals in 354 Modern Alluvium Samples from the Coral Rapids Area.

Summary of Abbreviations:

Ecl:	Eclogitic garnet
GI:	Group I
GII:	Group II
GIII:	Group III
GIV:	Group IV.
G9:	Group 9 lherzolitic garnet
G10:	Group 10 harzburgitic garnet
Kg:	Kilogram
KIM:	Kimberlite Indicator Mineral
Meg:	Megacrystic
MEL?:	Possibly from melnoite
N:	Normalised data
N factor:	Normalisation factor (based on estimated versus picked data)
OVL:	Overlap compositional field
R:	Raw Data

Note: Data are Presented as Raw and Normalised Values.

Sample	Table Feed	UTM		Garnet						Chromite						
											KIM		MEL?		OVL	
KAP-	(kg)	Easting	Northing	G10	G9	Meg	Ecl	Crst	KIM	N factor	R	N	R	N	R	N
1523	13.4	512867	5497751	0	0	0	0	0	0	1.4	1	1	28	38	4	5
1524	12.1	519965	5488523	0	0	0	0	0	0	1.0	0	0	2	2	0	0
1530	13.7	524642	5484443	0	0	0	0	0	0	1.0	0	0	0	0	0	0
1631	13.8	461223	5539415	0	0	0	0	0	0	1.0	0	0	4	4	7	7
1632	12.1	460994	5540365	0	0	0	0	0	0	2.8	0	0	16	44	6	17
1633	12.6	459669	5541633	0	0	0	0	0	0	1.0	1	1	1	1	1	1
1634	13.2	459377	5542612	0	0	0	0	0	0	1.0	0	0	0	0	0	0
1635	15.6	458833	5545312	0	0	0	0	0	0	1.0	0	0	0	0	0	0
1636	15.4	458540	5548186	0	0	0	0	0	0	1.0	0	0	6	6	1	1
1637	15.1	456915	5549394	0	0	0	0	0	0	2.2	0	0	4	9	5	11
1638	14.4	456303	5553885	0	1	0	0	0	1	1.9	0	0	8	16	7	14
1648	12.9	465188	5514230	0	0	0	0	2	0	1.0	0	0	0	0	0	0
1649	15.6	464825	5516574	0	0	0	0	0	0	1.0	0	0	0	0	0	0
1650	14.3	464612	5517496	0	0	0	0	0	0	1.0	0	0	0	0	0	0
1677	14.9	464441	5551227	0	0	0	0	0	0	1.0	0	0	0	0	0	0
1678	15.5	465220	5550661	0	0	0	0	0	0	1.0	0	0	0	0	0	0
1679	8.3	473015	5549327	0	0	0	0	0	0	1.0	0	0	3	3	3	3
1680	14.9	468630	5534859	0	0	0	0	0	0	1.0	0	0	0	0	0	0
1681	15.2	464751	5532531	0	0	0	0	0	0	1.0	0	0	0	0	0	0
1682	15.9	465930	5530018	0	0	0	0	0	0	1.0	0	0	0	0	0	0
1683	11.5	464292	5547905	0	1	1	0	0	2	2.9	0	0	26	77	4	12
1684	13.0	459996	5546609	0	0	0	0	0	0	1.0	0	0	1	1	0	0
1685	14.6	483066	5540303	0	0	0	0	0	0	1.0	0	0	0	0	0	0
1686	12.6	479382	5547099	0	0	0	0	0	0	1.0	0	0	6	6	0	0
1687	17.2	478452	5548777	0	0	0	0	0	0	1.0	0	0	0	0	0	0
1897	9.5	394819	5542085	0	1	0	0	0	1	3.1	0	0	5	16	2	6
1910	14.0	406471	5544507	0	3	0	0	0	3	3.4	1	3	7	24	19	66
1911	11.8	410355	5548807	0	1	0	0	0	1	1.0	0	0	1	1	3	3
1912	15.7	393960	5553240	0	0	0	0	1	0	1.0	0	0	0	0	5	5
1913	16.4	401918	5553108	0	0	0	0	0	0	1.0	0	0	0	0	0	0
1914	9.2	406052	5558071	0	0	0	0	0	0	1.0	0	0	0	0	0	0
1915	7.2	402302	5563570	0	0	0	0	2	0	1.0	0	0	2	2	0	0
1916	9.5	398413	5565264	1	0	1	0	0	2	1.0	0	0	1	1	7	7
1917	9.9	399395	5566291	0	1	0	0	2	1	1.0	0	0	5	5	2	2
1922	11.1	421055	5541086	0	1	0	0	0	1	2.0	0	0	3	6	6	12
1923	8.8	423011	5548355	0	0	0	0	0	0	4.4	1	4	7	31	35	153
1924	12.9	419954	5549411	0	0	0	0	0	0	1.0	0	0	0	0	0	0
1925	9.7	430511	5558887	0	0	0	0	0	0	1.0	0	0	0	0	0	0
1927	6.8	399871	5568056	0	1	0	1	2	2	1.6	0	0	4	6	10	16
1928	10.7	399353	5571069	0	0	0	0	0	0	1.0	0	0	0	0	0	0
1929	10.5	401893	5576994	0	0	0	0	0	0	1.0	0	0	0	0	0	0
1930	9.8	401955	5582145	0	0	0	0	1	0	2.7	3	8	11	29	28	74
1931	12.0	396177	5591422	0	0	0	0	0	0	1.0	0	0	1	1	0	0
1932	11.6	411829	5592152	0	0	0	0	0	0	1.0	0	0	2	2	0	0
1933	8.1	405990	5588735	0	0	0	0	0	0	1.0	0	0	1	1	2	2
1934	7.9	406290	5582250	0	0	0	0	0	0	2.1	0	0	8	17	0	0
1936	7.1	425795	5571040	0	0	0	0	0	0	6.0	2	12	16	96	13	78
1937	10.4	432029	5577391	0	0	0	0	1	0	2.0	2	4	2	4	11	22
1938	8.8	439838	5588640	0	0	0	0	0	0	1.0	0	0	0	0	0	0
1939	8.8	446174	5588884	0	1	0	0	0	1	2.0	1	2	4	8	8	16
1940	11.2	436218	5574353	0	2	0	0	0	2	2.5	4	10	8	20	27	67
1941	12.1	438027	5577933	0	1	0	0	1	1	2.5	0	0	2	5	2	5
1942	8.1	420877	5566515	0	0	0	0	3	0	1.8	2	4	3	5	3	5
1943	10.0	422806	5557467	0	0	0	0	0	0	1.0	1	1	3	3	1	1
1944	13.2	435036	5552307	0	0	0	0	0	0	1.0	0	0	0	0	0	0
1961	13.1	401666	5544566	0	1	0	0	3	1	1.0	0	0	1	1	2	2

Sample	Ilmenite					Cr-diopside											Olivine					Total KIMs	
		KIM		OTHER			KIM		GI		GII		GIII		GIV			KIM		OTHER			
KAP-	N factor	R	N	R	N	N factor	R	N	R	N	R	N	R	N	R	N	N factor	R	N	R	N	R	N
1523	1.0	0	0	0	0	1.0	0	0	1	1	2	2	1	1	5	5	1.0	0	0	0	0	1	1
1524	1.0	0	0	0	0	1.0	0	0	2	2	1	1	0	0	0	0	1.0	0	0	0	0	0	0
1530	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	1	1	1.0	0	0	0	0	0	0
1631	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
1632	1.0	0	0	1	1	1.0	1	1	1	1	0	0	0	0	5	5	1.0	0	0	0	0	1	1
1633	1.0	0	0	1	1	1.0	1	1	0	0	0	0	0	0	0	0	1.0	0	0	0	0	2	2
1634	1.0	0	0	0	0	1.0	0	0	0	0	0	0	1	1	0	0	1.0	0	0	0	0	0	0
1635	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
1636	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
1637	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
1638	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	1	1
1648	1.0	0	0	0	0	1.0	0	0	1	1	1	1	1	1	1	1	1.0	1	1	1	1	1	1
1649	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
1650	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
1677	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
1678	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	2	2	1.0	0	0	0	0	0	0
1679	1.0	0	0	0	0	1.0	0	0	1	1	0	0	0	0	0	0	1.0	0	0	0	0	0	0
1680	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
1681	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
1682	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
1683	1.0	3	3	1	1	1.0	0	0	3	3	0	0	0	0	1	1	1.0	0	0	0	0	5	5
1684	1.0	0	0	0	0	1.0	0	0	2	2	1	1	0	0	1	1	1.0	0	0	0	0	0	0
1685	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
1686	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
1687	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
1897	2.6	5	13	1	3	1.0	1	1	0	0	0	0	0	0	0	0	1.0	0	0	0	0	7	15
1910	1.0	1	1	0	0	1.0	0	0	1	1	0	0	1	1	5	5	1.0	0	0	1	1	5	7
1911	1.0	0	0	0	0	1.0	1	1	0	0	0	0	0	0	2	2	1.0	0	0	0	0	2	2
1912	1.0	4	4	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	4	4
1913	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	1	1	0	0
1914	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	1	1	1.0	0	0	0	0	0	0
1915	1.0	1	1	2	2	1.0	0	0	0	0	0	0	1	1	1	1	1.0	0	0	0	0	1	1
1916	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	3	3	1.0	0	0	0	0	2	2
1917	1.0	0	0	2	2	1.0	0	0	0	0	0	0	0	0	2	2	1.0	0	0	0	0	1	1
1922	1.0	6	6	3	3	1.0	0	0	0	0	0	0	1	1	2	2	1.0	0	0	0	0	7	7
1923	2.8	5	14	7	19	1.0	0	0	0	0	0	0	0	0	2	2	1.0	0	0	0	0	6	18
1924	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
1925	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
1927	1.0	10	10	16	16	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	12	12
1928	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
1929	1.0	0	0	0	0	1.0	0	0	0	0	1	1	1	1	3	3	1.0	0	0	0	0	0	0
1930	1.0	8	8	3	3	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	10	13
1931	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	2	2	1.0	0	0	0	0	0	0
1932	1.0	0	0	0	0	1.0	1	1	0	0	0	0	0	0	3	3	1.0	0	0	0	0	1	1
1933	1.0	1	1	1	1	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	1	1
1934	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	3	3	1.0	0	0	0	0	0	0
1936	1.0	0	0	1	1	1.0	0	0	0	0	0	0	0	0	3	3	1.0	0	0	1	1	2	12
1937	1.0	0	0	0	0	1.0	0	0	2	2	1	1	0	0	0	0	1.0	0	0	0	0	2	4
1938	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
1939	1.0	0	0	1	1	1.0	0	0	1	1	0	0	0	0	0	0	1.0	0	0	0	0	2	3
1940	1.0	1	1	2	2	1.0	0	0	1	1	1	1	0	0	4	4	1.0	1	1	0	0	8	14
1941	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	1	1
1942	1.0	0	0	0	0	1.0	1	1	0	0	0	0	0	0	0	0	1.0	0	0	0	0	3	5
1943	1.0	1	1	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	2	2
1944	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
1961	1.3	18	23	7	9	1.0	1	1	0	0	0	0	0	0	1	1	1.0	0	0	2	2	20	25

Sample	Table Feed	UTM		Garnet						Chromite						
											KIM		MEL?		OVL	
KAP-	(kg)	Easting	Northing	G10	G9	Meg	Ecl	Crst	KIM	N factor	R	N	R	N	R	N
1962	12.1	401689	5544647	0	0	0	0	0	0	1.5	2	3	16	23	26	38
1963	9.2	397547	5547477	0	0	0	0	0	0	1.9	0	0	1	2	8	15
1964	13.9	397690	5547585	0	4	0	0	0	4	2.6	0	0	11	28	9	23
1965	11.8	401098	5553925	0	5	0	0	0	5	3.5	1	4	7	25	17	60
1966	10.2	401151	5553987	0	1	0	0	1	1	2.0	0	0	1	2	19	37
1967	13.5	403606	5551931	0	1	0	0	0	1	1.0	0	0	1	1	0	0
1968	7.8	403106	5559836	0	3	0	0	1	3	1.8	0	0	9	17	14	26
1969	9.1	400292	5564712	0	6	1	2	4	9	4.0	1	4	12	48	35	139
1970	14.7	394536	5563145	0	0	0	0	0	0	1.0	0	0	0	0	0	0
1974	13.3	427067	5546684	0	0	0	0	0	0	1.0	0	0	0	0	0	0
1975	10.4	422829	5548412	0	1	0	0	0	1	1.8	1	2	1	2	17	31
1976	12.1	422449	5554489	0	0	0	0	1	0	2.0	1	2	2	4	5	10
1977	13.6	423982	5559480	0	0	0	0	0	0	1.0	0	0	0	0	0	0
1978	11.9	422324	5559430	0	1	0	0	0	1	23.5	0	0	2	47	49	1154
1979	12.1	421881	5566345	0	0	0	0	0	0	33.3	3	100	0	0	28	933
1980	13.2	399853	5570666	0	3	0	0	0	3	10.0	2	20	2	20	12	120
1981	16.8	399836	5570680	0	1	0	0	2	1	1.4	0	0	2	3	10	14
1982	10.5	401405	5576845	0	0	0	0	0	0	2.7	0	0	5	14	17	47
1983	14.0	402468	5581698	0	3	0	0	1	3	2.8	0	0	2	6	9	25
1984	13.7	398618	5585164	1	0	0	0	0	1	2.6	0	0	2	5	7	18
1985	12.3	416782	5595070	0	1	0	0	0	1	2.1	1	2	17	36	1	2
1986	8.8	416628	5593876	0	0	0	0	0	0	1.0	0	0	2	2	0	0
1987	13.2	409354	5590692	0	0	0	0	0	0	1.0	0	0	0	0	0	0
1988	16.3	407319	5590677	0	0	0	0	0	0	1.0	0	0	0	0	0	0
1989	7.2	406778	5588589	0	0	0	0	0	0	2.5	0	0	0	0	6	15
1990	11.9	408668	5579045	0	0	0	0	0	0	1.0	0	0	0	0	0	0
1991	13.6	429422	5576887	0	0	0	0	0	0	1.0	0	0	0	0	0	0
1992	9.2	438205	5581155	0	1	0	0	1	1	2.5	3	8	10	25	49	124
1993	9.7	439651	5581691	0	1	0	0	0	1	6.0	2	12	7	42	40	240
1994	11.1	444815	5584596	0	1	0	0	0	1	21.5	0	0	3	65	26	560
1995	13.3	451776	5595894	0	0	0	0	0	0	1.0	0	0	6	6	10	10
1996	14.5	434300	5569701	0	0	0	0	0	0	1.0	0	0	0	0	3	3
1997	7.6	424245	5567059	0	0	0	0	0	0	4.2	1	4	25	105	8	34
1998	9.2	424700	5559703	0	0	0	0	0	0	2.1	0	0	12	25	3	6
1999	13.8	413355	5557753	0	1	0	0	0	1	4.4	5	22	17	75	46	202
2000	14.1	438733	5552120	1	0	0	0	0	1	2.0	1	2	13	26	9	18
2003	11.4	437282	5541156	0	0	0	0	0	0	2.5	0	0	0	0	7	18
2004	11.0	435729	5540763	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2037	12.3	459086	5539256	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2039	9.4	466633	5534563	0	0	0	0	1	0	2.5	1	3	0	0	3	8
2041	8.7	457069	5539514	0	1	0	0	0	1	1.0	0	0	1	1	1	1
2043	16.4	469593	5534222	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2044	15.2	472319	5533579	0	0	0	0	1	0	1.0	0	0	3	3	1	1
2045	16.9	474077	5534369	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2046	13.1	473939	5535175	0	1	0	0	0	1	3.9	0	0	17	66	4	15
2047	15.2	470267	5534266	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2048	13.3	472841	5533678	0	0	0	0	0	0	1.0	0	0	6	6	2	2
2049	9.5	477355	5538207	0	0	0	0	0	0	1.8	0	0	5	9	1	2
2050	7.1	481721	5530323	0	0	0	0	0	0	1.5	0	0	16	24	2	3
2051	5.5	484405	5526180	0	0	0	0	1	0	1.6	0	0	12	19	5	8
2052	11.1	487363	5523030	0	0	0	0	0	0	2.5	0	0	5	13	0	0
2053	8.5	489214	5520199	0	0	0	1	0	1	1.7	0	0	17	28	6	10
2054	14.0	492147	5513357	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2055	12.1	496164	5512109	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2056	10.0	498950	5509544	0	1	0	0	0	1	3.6	2	7	45	161	8	29
2057	17.4	508372	5495381	0	0	0	0	0	0	1.0	0	0	0	0	0	0

F2

Sample	Ilmenite					Cr-diopside											Olivine					Total KIMs	
		KIM		OTHER			KIM		GI		GII		GIII		GIV			KIM		OTHER			
KAP-	N factor	R	N	R	N	N factor	R	N	R	N	R	N	R	N	R	N	N factor	R	N	R	N	R	N
1962	2.3	39	91	15	35	1.0	0	0	0	0	0	0	0	0	1	1	1.0	0	0	0	0	41	94
1963	1.0	0	0	0	0	1.0	0	0	1	1	0	0	0	0	0	0	1.0	0	0	0	0	0	0
1964	1.0	5	5	1	1	1.0	1	1	0	0	0	0	1	1	4	4	1.0	0	0	5	5	10	10
1965	2.0	10	20	2	4	1.0	0	0	1	1	0	0	0	0	11	11	1.0	0	0	1	1	16	29
1966	1.8	5	9	3	5	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	6	10
1967	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	1	1	1	1
1968	1.4	28	38	1	1	1.0	0	0	1	1	0	0	0	0	1	1	1.0	0	0	0	0	31	41
1969	2.1	23	49	9	19	1.0	1	1	0	0	0	0	0	0	1	1	1.0	0	0	1	1	34	63
1970	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
1974	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
1975	1.0	2	2	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	4	5
1976	1.0	0	0	0	0	1.0	0	0	1	1	1	1	1	1	2	2	1.0	0	0	0	0	1	2
1977	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
1978	5.5	3	17	5	28	1.0	0	0	0	0	0	0	0	0	4	4	1.0	0	0	0	0	4	18
1979	1.0	2	2	0	0	1.0	0	0	0	0	0	0	0	0	2	2	1.0	0	0	0	0	5	102
1980	1.0	1	1	1	1	1.0	0	0	0	0	1	1	1	1	7	7	1.0	0	0	0	0	6	24
1981	3.7	2	7	2	7	1.0	0	0	1	1	0	0	0	0	0	0	1.0	0	0	0	0	3	8
1982	2.1	6	13	13	27	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	6	13
1983	3.0	3	9	1	3	1.0	0	0	1	1	0	0	3	3	5	5	1.0	0	0	0	0	6	12
1984	3.3	6	20	2	7	1.0	0	0	0	0	0	0	0	0	3	3	1.0	0	0	0	0	7	21
1985	1.0	0	0	2	2	1.0	0	0	0	0	0	0	0	0	5	5	1.0	0	0	0	0	2	3
1986	1.0	0	0	0	0	1.0	0	0	0	0	0	0	1	1	6	6	1.0	0	0	0	0	0	0
1987	1.0	0	0	0	0	1.0	1	1	0	0	1	1	0	0	1	1	1.0	0	0	0	0	1	1
1988	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
1989	1.0	0	0	0	0	1.0	0	0	0	0	0	0	1	1	1	1	1.0	0	0	0	0	0	0
1990	1.0	0	0	0	0	1.0	1	1	0	0	0	0	0	0	0	0	1.0	0	0	0	0	1	1
1991	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
1992	1.8	12	21	17	30	1.0	0	0	0	0	0	0	0	0	2	2	1.0	0	0	0	0	16	30
1993	1.0	3	3	5	5	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	6	16
1994	1.0	2	2	5	5	1.0	0	0	0	0	0	0	1	1	3	3	1.0	0	0	0	0	3	3
1995	1.0	0	0	6	6	1.0	0	0	1	1	0	0	1	1	0	0	1.0	0	0	0	0	0	0
1996	1.0	2	2	1	1	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	2	2
1997	1.0	2	2	1	1	1.0	0	0	0	0	0	0	0	0	2	2	1.0	0	0	0	0	3	6
1998	1.0	0	0	1	1	1.0	0	0	0	0	0	0	2	2	4	4	1.0	0	0	0	0	0	0
1999	1.8	25	45	25	45	1.0	0	0	2	2	2	2	3	3	0	0	1.0	0	0	0	0	31	68
2000	2.8	7	19	0	0	1.0	0	0	1	1	0	0	1	1	2	2	1.0	0	0	0	0	9	22
2003	3.8	7	26	1	4	1.0	0	0	0	0	0	0	0	0	1	1	1.0	0	0	1	1	7	26
2004	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2037	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2039	1.0	0	0	0	0	1.0	0	0	2	2	0	0	1	1	6	6	1.0	0	0	0	0	1	3
2041	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	1	1
2043	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2044	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2045	1.0	0	0	0	0	1.0	0	0	1	1	0	0	1	1	0	0	1.0	0	0	0	0	0	0
2046	1.0	0	0	0	0	1.0	1	1	1	1	1	1	1	1	3	3	1.0	0	0	0	0	2	2
2047	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2048	1.0	0	0	0	0	1.0	0	0	1	1	0	0	1	1	0	0	1.0	0	0	0	0	0	0
2049	1.0	0	0	0	0	1.0	0	0	2	2	0	0	1	1	4	4	1.0	0	0	0	0	0	0
2050	1.0	0	0	1	1	1.0	0	0	1	1	0	0	4	4	0	0	1.0	0	0	0	0	0	0
2051	1.0	0	0	6	6	1.0	0	0	2	2	0	0	1	1	0	0	1.0	0	0	0	0	0	0
2052	1.0	0	0	0	0	1.0	0	0	3	3	0	0	1	1	5	5	1.0	0	0	0	0	0	0
2053	1.0	1	1	1	1	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	2	2
2054	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2055	1.0	0	0	0	0	1.0	1	1	0	0	0	0	0	0	0	0	1.0	0	0	0	0	1	1
2056	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	3	8
2057	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0

Sample	Table Feed	UTM		Garnet						Chromite						
											KIM		MEL?		OVL	
KAP-	(kg)	Easting	Northing	G10	G9	Meg	Ecl	Crst	KIM	N factor	R	N	R	N	R	N
2058	11.2	509697	5496613	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2059	10.6	506934	5499538	0	0	0	0	0	0	1.0	0	0	2	2	0	0
2060	9.4	507088	5501291	0	0	0	0	5	0	2.0	0	0	41	80	10	20
2061	17.1	478941	5533410	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2062	12.3	481525	5528256	0	0	0	0	0	0	1.0	0	0	4	4	1	1
2063	12.3	485349	5525501	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2064	8.5	488719	5522103	0	1	0	0	0	1	2.2	1	2	27	60	6	13
2065	7.9	489617	5515173	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2066	9.3	494866	5513289	0	0	0	0	0	0	1.5	0	0	20	30	2	3
2067	9.2	497420	5510644	0	0	0	0	0	0	4.8	0	0	20	97	4	19
2068	10.9	501087	5505848	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2069	10.5	508652	5498290	0	0	0	0	0	0	1.0	0	0	1	1	2	2
2070	11.1	506934	5500167	0	1	0	0	1	1	6.4	2	13	64	411	16	103
2071	10.2	506843	5502868	0	0	0	0	0	0	1.0	2	2	25	25	14	14
2072	14.3	504012	5505259	0	0	0	0	0	0	2.5	1	3	4	10	1	3
2073	13.7	502318	5505747	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2074	8.8	509301	5514300	0	0	0	0	0	0	1.6	0	0	12	20	2	3
2081	12.5	465205	5520088	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2082	12.2	509341	5514995	0	0	0	0	1	0	4.1	0	0	23	95	4	17
2083	10.0	509033	5516530	0	0	0	0	0	0	3.1	0	0	32	101	3	9
2084	12.0	509983	5494064	0	0	0	0	0	0	2.1	0	0	18	37	1	2
2085	16.7	506653	5518142	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2086	9.3	506610	5518072	0	0	0	0	0	0	3.8	1	4	52	200	8	31
2087	12.0	504267	5503457	0	1	0	0	0	1	18.8	0	0	21	394	5	94
2088	13.4	503844	5503747	0	0	0	0	0	0	1.6	2	3	21	33	3	5
2089	12.7	502524	5505492	0	1	0	0	0	1	1.0	0	0	0	0	0	0
2090	11.3	510778	5512509	0	0	0	0	0	0	13.2	0	0	14	184	6	79
2094	9.6	503101	5519662	0	0	0	0	0	0	9.2	2	18	23	210	7	64
2095	12.0	501707	5519969	0	0	0	0	0	0	1.6	2	3	13	21	4	6
2096	12.9	502284	5523948	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2097	9.5	501651	5527279	0	0	0	0	0	0	1.0	0	0	1	1	1	1
2098	10.1	498116	5533502	0	0	0	0	0	0	3.9	0	0	19	73	1	4
2099	11.5	494348	5535251	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2100	13.0	493956	5540988	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2101	12.2	475553	5544162	0	0	0	0	1	0	3.2	0	0	20	64	7	22
2103	10.0	473493	5547560	0	0	0	0	0	0	3.0	0	0	8	24	1	3
2104	9.4	470671	5555602	0	1	0	0	0	1	6.9	0	0	20	138	2	14
2105	9.7	468281	5558536	0	0	0	0	0	0	1.0	0	0	10	10	2	2
2106	10.5	454579	5590358	0	0	0	0	1	0	1.3	1	1	7	9	1	1
2107	6.8	451493	5579407	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2108	11.5	449465	5573011	0	0	0	0	0	0	2.0	0	0	8	16	12	23
2109	11.1	471315	5562100	0	1	0	0	0	1	4.8	0	0	14	67	7	33
2110	10.2	468090	5565385	0	1	0	0	0	1	1.4	0	0	17	23	3	4
2111	9.4	466819	5568027	0	1	0	0	0	1	4.4	0	0	25	111	7	31
2112	13.0	467121	5573043	0	1	0	0	1	1	2.0	0	0	7	14	3	6
2113	10.3	469223	5573725	0	2	0	0	0	2	10.6	0	0	17	180	5	53
2114	8.4	471858	5568036	0	1	0	0	0	1	1.3	0	0	15	19	7	9
2115	10.1	474272	5563333	0	1	0	0	0	1	2.9	0	0	13	38	5	15
2116	13.3	476010	5558054	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2117	12.4	449484	5572997	0	0	0	0	0	0	1.7	1	2	17	29	7	12
2118	13.9	448220	5566309	0	1	0	0	0	1	4.5	0	0	13	59	5	23
2119	10.8	446527	5549826	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2120	12.8	446078	5547612	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2121	9.2	452831	5568080	0	3	0	0	4	3	2.1	1	2	7	15	20	41
2122	11.6	455648	5574204	0	1	0	0	0	1	48.4	2	97	2	97	56	2713
2123	6.4	457190	5576412	0	0	0	0	0	0	1.0	0	0	0	0	0	0

Sample	Ilmenite					Cr-diopside											Olivine					Total KIMs	
		KIM		OTHER			KIM		GI		GII		GIII		GIV			KIM		OTHER			
KAP-	N factor	R	N	R	N	N factor	R	N	R	N	R	N	R	N	R	N	N factor	R	N	R	N	R	N
2058	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2059	1.0	0	0	0	0	1.0	0	0	0	0	0	0	1	1	3	3	1.0	0	0	0	0	0	0
2060	1.0	1	1	0	0	1.0	0	0	1	1	0	0	3	3	11	11	1.0	0	0	0	0	1	1
2061	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2062	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2063	1.0	0	0	0	0	1.0	0	0	1	1	1	1	0	0	2	2	1.0	0	0	0	0	0	0
2064	1.0	2	2	0	0	1.0	0	0	0	0	0	0	1	1	0	0	1.0	0	0	0	0	4	5
2065	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2066	1.0	2	2	1	1	1.0	0	0	1	1	0	0	0	0	0	0	1.0	0	0	0	0	2	2
2067	1.0	2	2	0	0	1.0	0	0	0	0	0	0	0	0	3	3	1.0	0	0	0	0	2	2
2068	1.0	0	0	0	0	1.0	0	0	0	0	0	0	1	1	10	10	1.0	0	0	0	0	0	0
2069	1.0	0	0	0	0	1.0	0	0	0	0	0	0	1	1	1	1	1.0	0	0	0	0	0	0
2070	1.0	3	3	4	4	1.0	0	0	2	2	0	0	1	1	3	3	1.0	0	0	0	0	6	17
2071	1.0	1	1	6	6	1.0	0	0	5	5	0	0	2	2	11	11	1.0	0	0	0	0	3	3
2072	1.0	0	0	0	0	1.0	0	0	2	2	0	0	0	0	0	0	1.0	0	0	0	0	1	3
2073	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2074	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2081	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2082	1.0	0	0	0	0	1.0	0	0	0	0	1	1	0	0	2	2	1.0	0	0	0	0	0	0
2083	1.0	0	0	0	0	1.0	0	0	0	0	1	1	1	1	2	2	1.0	0	0	0	0	0	0
2084	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	6	6	1.0	0	0	0	0	0	0
2085	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2086	1.0	0	0	0	0	1.0	0	0	0	0	0	0	2	2	4	4	1.0	0	0	0	0	1	4
2087	1.0	0	0	0	0	1.0	0	0	1	1	0	0	2	2	1	1	1.0	0	0	0	0	1	1
2088	1.0	0	0	0	0	1.4	0	0	3	4	0	0	1	1	19	27	1.0	0	0	0	0	2	3
2089	1.0	0	0	0	0	1.0	0	0	0	0	1	1	0	0	1	1	1.0	0	0	0	0	1	1
2090	1.0	1	1	1	1	1.0	0	0	0	0	0	0	1	1	2	2	1.0	0	0	0	0	1	1
2094	1.0	0	0	3	3	1.0	0	0	0	0	0	0	0	0	3	3	1.0	0	0	0	0	2	18
2095	1.0	0	0	0	0	1.0	0	0	1	1	2	2	0	0	18	18	1.0	0	0	0	0	2	3
2096	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	1	1	1.0	0	0	0	0	0	0
2097	1.0	0	0	2	2	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2098	1.0	0	0	0	0	1.0	0	0	0	0	0	0	2	2	1	1	1.0	0	0	0	0	0	0
2099	1.0	0	0	0	0	1.0	0	0	0	0	1	1	0	0	2	2	1.0	0	0	0	0	0	0
2100	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2101	1.0	0	0	0	0	1.0	0	0	2	2	2	2	1	1	1	1	1.0	0	0	0	0	0	0
2103	1.0	0	0	0	0	1.0	0	0	1	1	0	0	0	0	6	6	1.0	0	0	0	0	0	0
2104	1.0	0	0	8	8	1.0	0	0	11	11	0	0	0	0	2	2	1.0	0	0	0	0	1	1
2105	1.0	0	0	0	0	1.0	1	1	1	1	1	1	4	4	16	16	1.0	0	0	0	0	1	1
2106	2.0	4	8	2	4	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	5	9
2107	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2108	1.0	2	2	0	0	1.0	0	0	3	3	0	0	0	0	0	0	1.0	0	0	1	1	2	2
2109	1.0	0	0	0	0	1.0	1	1	0	0	1	1	0	0	1	1	1.0	0	0	0	0	2	2
2110	1.0	0	0	1	1	1.0	0	0	1	1	1	1	5	5	5	5	1.0	0	0	0	0	1	1
2111	1.0	7	7	12	12	1.0	0	0	2	2	1	1	1	1	1	1	1.0	0	0	0	0	8	8
2112	1.0	0	0	2	2	1.0	0	0	1	1	0	0	1	1	2	2	1.0	0	0	0	0	1	1
2113	1.0	1	1	2	2	1.0	0	0	0	0	0	0	1	1	4	4	1.0	0	0	0	0	3	3
2114	1.0	0	0	0	0	1.0	0	0	0	0	0	0	1	1	5	5	1.0	0	0	0	0	1	1
2115	1.0	1	1	0	0	1.0	0	0	1	1	0	0	2	2	3	3	1.0	0	0	0	0	2	2
2116	1.0	0	0	0	0	1.0	0	0	1	1	0	0	1	1	10	10	1.0	0	0	0	0	0	0
2117	1.0	1	1	0	0	1.0	0	0	0	0	0	0	0	0	1	1	1.0	0	0	0	0	2	3
2118	1.0	0	0	0	0	1.0	1	1	2	2	0	0	2	2	6	6	1.0	0	0	0	0	2	2
2119	1.0	0	0	0	0	1.0	0	0	0	0	1	1	0	0	0	0	1.0	0	0	0	0	0	0
2120	1.0	0	0	0	0	1.0	0	0	0	0	0	0	1	1	13	13	1.0	0	0	0	0	0	0
2121	1.5	10	15	10	15	1.0	0	0	0	0	0	0	0	0	0	0	2.4	0	0	32	77	14	20
2122	2.7	20	54	13	35	1.0	0	0	4	4	1	1	3	3	1	1	43.0	0	0	48	2064	23	152
2123	1.0	0	0	0	0	1.0	0	0	5	5	0	0	6	6	8	8	8.9	3	27	30	266	3	27

Sample	Table Feed	UTM		Garnet						Chromite						
											KIM		MEL?		OVL	
KAP-	(kg)	Easting	Northing	G10	G9	Meg	Ecl	Crst	KIM	N factor	R	N	R	N	R	N
2124	10.1	459856	5583521	0	1	0	0	2	1	2.1	0	0	7	15	3	6
2125	14.2	461286	5588835	0	0	0	0	0	0	1.0	0	0	2	2	0	0
2126	9.2	460492	5590876	0	0	0	0	0	0	4.3	0	0	5	22	17	74
2127	14.1	467314	5599621	0	0	0	0	0	0	1.0	1	1	3	3	5	5
2128	11.0	463883	5586120	0	0	0	0	0	0	1.4	0	0	10	14	4	6
2129	9.8	465193	5579205	0	0	0	0	1	0	3.4	0	0	13	44	5	17
2130	15.1	464954	5579027	0	1	0	0	0	1	1.8	0	0	9	16	1	2
2131	11.7	455601	5556416	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2132	15.1	459525	5543301	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2133	7.8	483954	5574831	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2134	11.4	482464	5585415	0	0	0	0	0	0	1.7	1	2	1	2	1	2
2135	11.8	480199	5591870	0	1	0	0	0	1	1.0	0	0	5	5	2	2
2136	9.6	491966	5593994	0	1	0	0	0	1	5.5	1	5	23	126	4	22
2137	12.5	492489	5590566	0	0	0	0	1	0	1.0	0	0	2	2	0	0
2138	14.4	493734	5586833	0	0	0	0	0	0	1.0	0	0	1	1	0	0
2139	12.6	496550	5587419	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2140	10.0	493330	5580379	0	0	0	0	0	0	4.5	0	0	8	36	3	14
2141	11.1	490787	5576907	0	1	0	0	0	1	2.8	0	0	20	56	2	6
2142	9.6	490512	5574226	0	0	0	0	0	0	1.7	0	0	6	10	2	3
2143	10.0	494420	5543651	0	1	0	0	0	1	2.5	1	3	18	45	1	3
2144	13.1	497176	5545750	0	0	0	0	0	0	1.0	0	0	1	1	0	0
2145	10.2	496807	5548535	0	0	0	0	0	0	1.8	0	0	14	25	1	2
2146	10.8	496977	5552792	0	1	0	0	0	1	16.8	0	0	21	354	3	51
2147	12.5	496991	5554835	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2148	12.4	495844	5557358	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2149	7.9	497385	5561625	1	1	0	0	1	2	8.2	1	8	19	156	3	25
2153	13.9	479072	5511071	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2154	8.6	509076	5514504	0	0	0	0	1	0	6.3	0	0	32	200	4	25
2155	13.4	507860	5517772	0	0	0	0	0	0	7.5	1	8	30	225	5	38
2156	12.5	504536	5518142	0	0	0	0	0	0	8.2	0	0	21	172	4	33
2157	16.4	502489	5519451	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2158	12.6	502476	5518771	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2159	17.9	499828	5529404	0	0	0	0	0	0	1.0	0	0	9	9	0	0
2160	15.8	495309	5534610	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2161	14.8	494336	5536057	0	0	0	0	0	0	3.5	0	0	24	84	4	14
2162	13.2	471957	5555521	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2163	10.6	469340	5556829	0	1	0	0	0	1	36.1	0	0	18	649	3	108
2164	8.3	470775	5560576	0	1	0	0	0	1	1.5	0	0	23	35	6	9
2165	10.8	502151	5526219	0	0	0	0	0	0	1.9	0	0	31	58	4	8
2166	12.4	469722	5563399	0	0	0	0	0	0	1.0	0	0	1	1	0	0
2167	12.6	467168	5566188	0	0	0	0	0	0	3.0	1	3	14	42	4	12
2168	7.6	466761	5571750	0	1	0	0	0	1	14.6	1	15	21	306	13	189
2169	10.8	466874	5575104	0	2	1	3	0	6	2.1	0	0	10	21	14	29
2170	15.6	470197	5571792	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2171	10.1	474194	5565417	0	0	0	0	0	0	3.8	0	0	17	65	3	11
2172	8.0	475679	5561963	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2173	12.5	478630	5556471	0	0	0	0	0	0	10.0	0	0	16	160	3	30
2174	10.4	454985	5591170	0	0	0	0	0	0	3.0	0	0	3	9	2	6
2175	18.6	452249	5582787	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2176	8.5	449810	5575205	1	0	0	0	0	1	2.5	1	3	2	5	2	5
2177	7.6	448861	5568957	0	2	0	0	0	2	1.9	0	0	3	6	3	6
2178	6.5	476467	5542175	0	0	0	0	0	0	1.0	1	1	14	14	1	1
2179	9.9	448893	5563064	0	0	0	0	0	0	1.2	1	1	15	18	7	8
2180	16.9	441996	5549633	0	0	0	0	0	0	1.0	0	0	3	3	0	0
2181	6.9	452897	5566153	0	3	0	0	0	3	1.0	1	1	0	0	1	1
2182	9.6	454147	5569265	0	0	0	0	0	0	3.0	0	0	3	9	6	18

Sample	Ilmenite					Cr-diopside											Olivine					Total	
		KIM		OTHER			KIM		GI		GII		GIII		GIV			KIM		OTHER		KIMs	
KAP-	N factor	R	N	R	N	N factor	R	N	R	N	R	N	R	N	R	N	N factor	R	N	R	N	R	N
2124	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	1	1	2.6	0	0	34	89	1	1
2125	1.0	0	0	0	0	1.0	0	0	5	5	0	0	13	13	2	2	101.2	0	0	48	4858	0	0
2126	1.0	1	1	8	8	1.0	0	0	3	3	0	0	1	1	4	4	40.2	4	161	48	1930	5	162
2127	1.0	0	0	1	1	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	10	10	1	1
2128	1.0	0	0	8	8	1.0	0	0	2	2	0	0	2	2	5	5	1.0	0	0	0	0	0	0
2129	1.0	0	0	0	0	1.0	1	1	2	2	2	2	2	2	2	2	1.0	0	0	0	0	1	1
2130	1.0	0	0	0	0	1.0	0	0	3	3	0	0	1	1	0	0	1.0	0	0	0	0	1	1
2131	1.0	0	0	0	0	1.0	0	0	1	1	0	0	0	0	3	3	1.0	0	0	0	0	0	0
2132	1.0	0	0	1	1	1.0	0	0	0	0	0	0	1	1	1	1	1.0	0	0	1	1	0	0
2133	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2134	1.0	0	0	0	0	1.0	0	0	2	2	0	0	1	1	2	2	1.0	0	0	0	0	1	2
2135	1.0	1	1	0	0	1.0	0	0	4	4	0	0	3	3	0	0	1.0	0	0	0	0	2	2
2136	1.0	0	0	5	5	1.0	0	0	2	2	0	0	0	0	5	5	1.0	0	0	0	0	1	1
2137	1.0	0	0	1	1	1.0	0	0	1	1	0	0	0	0	3	3	1.0	0	0	0	0	0	0
2138	1.0	0	0	0	0	1.0	0	0	0	0	0	0	1	1	0	0	1.0	0	0	0	0	0	0
2139	1.0	0	0	0	0	1.0	0	0	0	0	0	0	1	1	9	9	1.0	0	0	0	0	0	0
2140	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	2	2	1.0	0	0	0	0	0	0
2141	1.0	0	0	3	3	1.0	0	0	1	1	0	0	3	3	1	1	1.0	0	0	0	0	1	1
2142	1.0	0	0	1	1	1.0	0	0	1	1	0	0	3	3	10	10	1.0	0	0	0	0	0	0
2143	1.0	1	1	0	0	1.0	0	0	1	1	0	0	0	0	4	4	1.0	0	0	0	0	3	5
2144	1.0	0	0	0	0	1.0	0	0	0	0	1	1	0	0	0	0	1.0	0	0	0	0	0	0
2145	1.0	0	0	0	0	1.0	0	0	0	0	1	1	1	1	5	5	1.0	0	0	0	0	0	0
2146	1.0	0	0	0	0	1.0	0	0	1	1	0	0	1	1	0	0	1.0	0	0	0	0	1	1
2147	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2148	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2149	1.0	1	1	0	0	1.0	0	0	1	1	0	0	0	0	2	2	1.0	0	0	0	0	4	11
2153	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2154	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	2	2	1.0	0	0	0	0	0	0
2155	1.0	0	0	0	0	1.0	0	0	1	1	0	0	5	5	10	10	1.0	0	0	0	0	1	8
2156	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	1	1	1.0	0	0	0	0	0	0
2157	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	1	1	1.0	0	0	0	0	0	0
2158	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2159	1.0	0	0	0	0	1.0	0	0	0	0	1	1	0	0	1	1	1.0	0	0	0	0	0	0
2160	1.0	0	0	0	0	1.0	0	0	1	1	0	0	0	0	1	1	1.0	0	0	0	0	0	0
2161	1.0	0	0	0	0	1.0	0	0	1	1	1	1	1	1	3	3	1.0	0	0	0	0	0	0
2162	1.0	0	0	0	0	1.0	0	0	1	1	0	0	0	0	1	1	1.0	0	0	0	0	0	0
2163	1.0	1	1	1	1	1.0	0	0	6	6	0	0	1	1	2	2	1.0	0	0	0	0	2	2
2164	1.0	1	1	0	0	1.0	0	0	1	1	0	0	0	0	1	1	1.0	0	0	0	0	2	2
2165	1.0	0	0	0	0	1.0	0	0	2	2	1	1	0	0	11	11	1.0	0	0	0	0	0	0
2166	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2167	1.0	0	0	0	0	1.0	0	0	0	0	0	0	1	1	0	0	1.0	0	0	0	0	1	3
2168	1.0	1	1	0	0	1.0	0	0	1	1	2	2	2	2	2	2	1.0	0	0	0	0	2	2
2169	2.6	5	13	1	3	1.0	0	0	1	1	2	2	0	0	3	3	1.0	0	0	0	0	11	19
2170	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2171	1.0	0	0	0	0	1.0	0	0	2	2	0	0	0	0	3	3	1.0	0	0	0	0	0	0
2172	1.0	0	0	0	0	1.0	0	0	1	1	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2173	1.0	0	0	0	0	1.0	0	0	1	1	0	0	0	0	7	7	1.0	0	0	0	0	0	0
2174	1.0	0	0	0	0	1.0	0	0	1	1	0	0	0	0	1	1	1.0	1	1	1	1	1	1
2175	1.0	0	0	0	0	1.0	0	0	1	1	1	1	0	0	8	8	1.0	0	0	0	0	0	0
2176	1.0	0	0	0	0	1.0	0	0	0	0	0	0	1	1	0	0	1.0	0	0	0	0	2	4
2177	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	2	2
2178	1.0	0	0	0	0	1.0	0	0	5	5	0	0	0	0	0	0	1.0	0	0	0	0	1	1
2179	1.0	2	2	2	2	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	3	3
2180	1.0	0	0	1	1	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2181	1.0	0	0	0	0	1.0	0	0	2	2	2	2	4	4	9	9	55.0	0	0	39	2145	3	3
2182	1.0	1	1	2	2	1.0	0	0	1	1	0	0	5	5	1	1	110.0	1	110	27	2970	2	111

Sample	Table Feed	UTM		Garnet						Chromite						
											KIM		MEL?		OVL	
KAP-	(kg)	Easting	Northing	G10	G9	Meg	Ecl	Crst	KIM	N factor	R	N	R	N	R	N
2183	9.5	458157	5578457	0	2	0	0	0	2	15.0	0	0	1	15	8	120
2184	10.5	459514	5583895	0	0	0	0	0	0	6.0	0	0	2	12	3	18
2185	10.0	466125	5597482	0	0	0	0	0	0	1.0	0	0	1	1	1	1
2186	8.1	463465	5591618	0	2	0	0	0	2	2.4	0	0	17	40	3	7
2187	7.0	463974	5581743	0	0	0	0	0	0	1.0	0	0	8	8	1	1
2188	11.3	468891	5578759	0	1	0	0	0	1	4.0	0	0	3	12	1	4
2189	16.9	456739	5550887	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2190	13.5	482060	5581525	0	0	0	0	0	0	1.0	0	0	1	1	1	1
2191	13.9	481251	5588500	0	0	0	0	0	0	1.0	0	0	4	4	0	0
2192	9.6	479988	5594724	0	0	1	0	0	1	1.0	0	0	0	0	0	0
2193	6.9	493477	5594050	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2194	8.9	493967	5587702	0	0	0	0	0	0	6.3	0	0	17	106	2	13
2195	11.4	494182	5584121	0	0	0	0	0	0	2.8	1	3	8	23	2	6
2196	11.7	493606	5581269	0	1	0	0	0	1	4.6	1	5	41	187	11	50
2197	6.9	490038	5578762	0	0	0	0	0	0	1.0	0	0	8	8	3	3
2198	10.2	491133	5575508	0	1	0	0	0	1	6.0	0	0	8	48	1	6
2199	19.2	493944	5543328	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2200	15.7	495232	5543858	0	0	0	0	0	0	1.0	0	0	2	2	0	0
2201	12.2	496926	5547699	0	0	0	0	0	0	1.0	0	0	1	1	0	0
2202	16.8	498323	5550745	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2203	12.1	498434	5552419	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2204	15.7	496104	5557082	0	0	0	0	1	0	2.0	0	0	9	18	0	0
2205	15.6	496139	5560267	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2206	7.5	497244	5563807	0	0	0	0	0	0	1.0	0	0	7	7	0	0
2207	12.0	495178	5569536	0	1	0	0	0	1	11.4	1	11	21	239	5	57
2208	15.2	491031	5570637	0	1	0	0	0	1	2.0	0	0	8	16	1	2
2209	10.6	511911	5595221	1	0	0	0	0	1	9.5	0	0	44	418	8	76
2210	15.1	516912	5589990	0	0	0	0	0	0	1.0	0	0	1	1	0	0
2211	15.5	516753	5589118	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2212	8.6	519354	5584853	0	1	0	0	0	1	11.8	0	0	23	271	2	24
2213	8.5	520026	5583531	0	0	0	0	0	0	11.3	1	11	25	282	9	101
2214	15.6	520415	5579867	0	0	0	0	0	0	1.0	0	0	7	7	1	1
2215	14.4	520250	5577305	0	0	0	0	0	0	1.5	1	2	7	11	0	0
2216	13.9	520885	5575938	0	0	0	0	0	0	1.0	1	1	16	16	1	1
2217	12.0	525561	5567412	0	0	0	0	0	0	6.8	1	7	31	211	3	20
2218	14.7	526074	5566365	0	0	0	0	1	0	1.0	0	0	3	3	1	1
2219	7.0	525651	5565139	0	0	0	0	0	0	7.5	0	0	19	143	1	8
2220	8.5	519435	5592578	0	0	0	0	0	0	9.4	0	0	30	283	2	19
2221	10.7	521563	5588590	0	1	0	0	0	1	10.8	1	11	22	238	4	43
2222	10.9	521900	5587894	0	0	0	0	0	0	8.3	2	17	29	241	6	50
2223	13.1	523864	5585555	0	0	0	0	0	0	1.7	0	0	13	22	2	3
2224	8.2	524288	5584860	0	1	0	0	0	1	6.7	1	7	18	120	3	20
2225	14.4	527047	5580070	0	1	0	0	0	1	1.0	0	0	6	6	2	2
2226	4.7	529079	5577938	0	0	0	0	0	0	2.0	1	2	13	26	3	6
2227	10.7	534209	5576092	0	0	0	0	0	0	2.3	0	0	10	23	2	5
2228	16.2	535724	5573701	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2229	8.6	534530	5570826	0	0	0	0	0	0	9.4	1	9	37	348	5	47
2230	9.6	535026	5565198	0	0	0	0	0	0	1.0	0	0	10	10	0	0
2231	11.8	526116	5560640	0	1	0	0	0	1	1.0	0	0	6	6	1	1
2232	13.7	526719	5558479	0	0	0	0	0	0	2.0	2	4	39	78	9	18
2233	11.5	501096	5577285	0	0	0	0	0	0	1.0	2	2	7	7	1	1
2234	15.5	499895	5580520	0	0	0	0	0	0	1.0	0	0	2	2	0	0
2235	13.6	504353	5593936	0	0	0	0	0	0	1.5	0	0	10	15	0	0
2236	14.6	505245	5593415	0	1	0	0	0	1	2.0	0	0	9	18	0	0
2237	9.4	506479	5591131	0	0	0	0	0	0	4.0	0	0	18	72	2	8
2238	16.5	508230	5589799	0	0	0	0	0	0	1.0	0	0	7	7	0	0

Sample	Ilmenite					Cr-diopside											Olivine					Total KIMs	
		KIM		OTHER			KIM		GI		GII		GIII		GIV			KIM		OTHER			
KAP-	N factor	R	N	R	N	N factor	R	N	R	N	R	N	R	N	R	N	N factor	R	N	R	N	R	N
2183	1.0	0	0	1	1	1.0	0	0	2	2	1	1	2	2	2	2	171.7	0	0	28	4807	2	2
2184	1.0	0	0	0	0	1.0	0	0	0	0	0	0	6	6	0	0	101.0	1	101	29	2929	1	101
2185	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	8	8	0	0
2186	1.0	0	0	0	0	1.0	0	0	1	1	0	0	3	3	3	3	1.0	0	0	0	0	2	2
2187	1.0	1	1	0	0	1.0	0	0	0	0	0	0	0	0	4	4	1.0	1	1	0	0	2	2
2188	1.0	0	0	0	0	1.0	0	0	2	2	0	0	2	2	3	3	1.0	0	0	0	0	1	1
2189	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2190	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2191	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2192	1.0	0	0	0	0	1.0	0	0	1	1	0	0	1	1	1	1	1.0	0	0	0	0	1	1
2193	1.0	0	0	0	0	1.0	0	0	0	0	0	0	2	2	1	1	1.0	0	0	0	0	0	0
2194	1.0	0	0	0	0	1.0	0	0	1	1	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2195	1.0	1	1	4	4	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	2	4
2196	1.0	1	1	1	1	1.0	0	0	0	0	0	0	0	0	2	2	1.0	0	0	0	0	3	7
2197	1.0	0	0	0	0	1.0	0	0	1	1	0	0	1	1	2	2	1.0	0	0	0	0	0	0
2198	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	1	1
2199	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2200	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2201	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2202	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	1	1	1.0	0	0	0	0	0	0
2203	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2204	1.0	0	0	1	1	1.0	0	0	3	3	1	1	1	1	0	0	1.0	0	0	0	0	0	0
2205	1.0	0	0	0	0	1.0	0	0	2	2	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2206	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2207	1.0	0	0	0	0	1.0	0	0	1	1	0	0	0	0	4	4	1.0	0	0	0	0	2	12
2208	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	1	1	1.0	0	0	0	0	1	1
2209	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	1	1	1.0	0	0	0	0	1	1
2210	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2211	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2212	1.0	0	0	0	0	1.0	0	0	2	2	0	0	0	0	4	4	1.0	0	0	0	0	1	1
2213	1.0	0	0	2	2	1.0	0	0	0	0	0	0	0	0	7	7	1.0	0	0	0	0	1	11
2214	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2215	1.0	0	0	1	1	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	1	2
2216	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	1	1
2217	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	11	11	1.0	0	0	0	0	1	7
2218	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2219	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	1	1	1.0	0	0	0	0	0	0
2220	1.0	1	1	0	0	1.0	0	0	0	0	0	0	1	1	4	4	1.0	0	0	0	0	1	1
2221	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	13	13	1.0	0	0	0	0	2	12
2222	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	2	17
2223	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	1	1	1.0	0	0	0	0	0	0
2224	1.0	0	0	0	0	1.0	0	0	1	1	0	0	0	0	1	1	1.0	0	0	0	0	2	8
2225	1.0	0	0	0	0	1.0	0	0	0	0	0	0	1	1	1	1	1.0	0	0	0	0	1	1
2226	1.0	0	0	0	0	1.0	0	0	0	0	1	1	0	0	5	5	1.0	0	0	0	0	1	2
2227	1.0	0	0	0	0	1.0	0	0	0	0	0	0	1	1	5	5	1.0	0	0	0	0	0	0
2228	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2229	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	1	1	1.0	0	0	0	0	1	9
2230	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	1	1	1.0	0	0	0	0	0	0
2231	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	11	11	1.0	0	0	0	0	1	1
2232	1.0	0	0	0	0	1.0	0	0	2	2	0	0	2	2	6	6	1.0	0	0	0	0	2	4
2233	1.0	0	0	1	1	1.0	0	0	0	0	6	6	0	0	2	2	1.0	0	0	0	0	2	2
2234	1.0	0	0	0	0	1.0	0	0	0	0	2	2	1	1	2	2	1.0	0	0	0	0	0	0
2235	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2236	1.0	0	0	1	1	1.0	0	0	0	0	0	0	0	0	9	9	1.0	0	0	0	0	1	1
2237	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	1	1	1.0	0	0	0	0	0	0
2238	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	3	3	1.0	0	0	0	0	0	0

Sample	Table Feed	UTM		Garnet						Chromite						
											KIM		MEL?		OVL	
KAP-	(kg)	Easting	Northing	G10	G9	Meg	Ecl	Crst	KIM	N factor	R	N	R	N	R	N
2239	16.8	508963	5588090	0	0	0	0	0	0	1.0	0	0	3	3	1	1
2240	8.2	508362	5587560	0	0	0	0	0	0	3.3	1	3	39	130	6	20
2241	12.3	508904	5585493	0	0	0	0	0	0	2.0	1	2	20	40	1	2
2242	9.0	509322	5583329	0	1	0	0	0	1	6.3	0	0	28	176	6	38
2243	10.7	511537	5578316	0	0	0	0	0	0	5.0	0	0	17	85	3	15
2245	10.4	513304	5574741	0	1	0	0	0	1	1.0	0	0	11	11	0	0
2246	13.9	514292	5573479	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2247	11.4	514247	5568668	0	0	0	0	1	0	2.0	0	0	19	38	1	2
2248	9.3	514032	5566247	0	0	0	0	0	0	3.8	0	0	38	143	2	8
2249	9.2	512882	5560827	0	0	0	0	0	0	1.0	0	0	14	14	0	0
2250	19.1	505720	5581281	0	0	0	0	0	0	1.0	0	0	8	8	2	2
2251	11.2	497096	5564354	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2252	9.3	494172	5569708	0	3	0	0	1	3	2.8	0	0	17	48	5	14
2264	11.3	514179	5487239	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2265	10.8	527957	5483816	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2266	10.7	534594	5484358	0	0	0	0	0	0	7.5	0	0	20	150	4	30
2267	7.5	535820	5484321	0	0	0	0	0	0	9.6	3	29	17	163	1	10
2270	10.3	526374	5552670	0	1	0	0	1	1	4.9	1	5	77	378	9	44
2271	15.4	529998	5551553	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2272	15.9	530929	5551574	1	0	0	0	0	1	1.5	0	0	20	30	0	0
2273	13.8	533407	5548348	0	0	0	0	0	0	1.0	0	0	1	1	0	0
2274	12.5	533292	5548953	0	1	0	0	0	1	2.1	1	2	37	79	7	15
2275	12.0	531963	5548912	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2276	10.0	533681	5540952	0	2	0	0	0	2	17.3	0	0	44	759	4	69
2277	8.7	533716	5540948	0	2	0	0	0	2	8.5	2	17	48	410	9	77
2278	13.1	533133	5546165	0	0	0	0	0	0	1.0	0	0	3	3	0	0
2279	13.0	533140	5545388	0	0	0	0	0	0	8.6	1	9	28	240	7	60
2280	11.3	533749	5541315	0	0	0	0	0	0	1.0	0	0	9	9	0	0
2281	13.2	534533	5536570	0	0	0	0	0	0	1.0	0	0	1	1	3	3
2282	13.2	535356	5532881	0	0	0	0	0	0	1.0	0	0	6	6	0	0
2283	12.6	535588	5532389	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2291	16.1	516297	5567792	0	0	0	0	0	0	1.0	0	0	1	1	0	0
2292	13.0	515107	5543193	0	0	0	0	0	0	2.0	0	0	18	36	2	4
2293	14.5	517309	5539010	0	2	0	0	0	2	2.0	0	0	9	18	1	2
2294	15.3	523038	5540141	0	0	0	0	0	0	1.0	0	0	3	3	0	0
2295	15.5	510797	5543107	0	1	0	0	0	1	1.0	0	0	1	1	1	1
2296	10.2	508556	5553197	0	0	0	0	0	0	2.7	1	3	11	29	2	5
2297	12.8	508948	5557168	0	0	0	0	0	0	1.0	0	0	1	1	1	1
2298	14.9	503829	5565287	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2299	11.0	501131	5566491	0	0	0	0	0	0	1.7	0	0	8	13	2	3
2300	14.2	497125	5572995	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2301	15.3	490871	5571579	0	0	0	0	0	0	1.0	0	0	2	2	0	0
2302	8.6	479006	5556209	0	3	0	0	1	3	15.6	0	0	33	514	6	93
2303	5.2	479094	5556201	0	1	0	0	1	1	2.7	0	0	13	35	2	5
2304	10.4	480805	5554778	0	0	0	0	0	0	1.0	0	0	2	2	0	0
2305	7.6	483236	5551268	0	0	0	0	0	0	1.0	0	0	1	1	1	1
2306	12.6	469032	5539409	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2335	19.5	530862	5491313	0	0	0	0	1	0	1.0	0	0	19	19	2	2
2336	14.0	531895	5486133	0	0	0	0	0	0	1.0	0	0	1	1	0	0
2337	9.0	510424	5483477	0	0	0	0	0	0	1.0	0	0	1	1	0	0
2344	19.5	512677	5575236	0	0	0	0	0	0	1.0	0	0	1	1	0	0
2349	13.7	517392	5507387	0	1	0	0	0	1	1.0	0	0	1	1	1	1
2350	13.5	527591	5531414	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2351	11.3	529159	5535932	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2352	14.0	530043	5537443	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2353	14.5	525625	5511154	0	0	0	0	0	0	1.8	0	0	48	87	5	9

Sample	Ilmenite					Cr-diopside											Olivine					Total KIMs	
		KIM		OTHER			KIM		GI		GII		GIII		GIV			KIM		OTHER			
KAP-	N factor	R	N	R	N	N factor	R	N	R	N	R	N	R	N	R	N	N factor	R	N	R	N	R	N
2239	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	1	1	1.0	0	0	0	0	0	0
2240	1.0	0	0	0	0	1.0	0	0	1	1	0	0	2	2	16	16	1.0	0	0	0	0	1	3
2241	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	6	6	1.0	0	0	0	0	1	2
2242	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	5	5	1.0	0	0	0	0	1	1
2243	1.0	0	0	0	0	1.0	0	0	0	0	0	0	1	1	1	1	1.0	0	0	0	0	0	0
2245	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	3	3	1.0	0	0	0	0	1	1
2246	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2247	1.0	0	0	0	0	1.0	0	0	0	0	0	0	1	1	2	2	1.0	0	0	0	0	0	0
2248	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	4	4	1.0	0	0	0	0	0	0
2249	1.0	0	0	0	0	1.0	0	0	0	0	0	0	1	1	4	4	1.0	0	0	0	0	0	0
2250	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	5	5	1.0	0	0	0	0	0	0
2251	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	1	1	1.0	0	0	0	0	0	0
2252	1.0	0	0	0	0	1.0	2	2	5	5	1	1	1	1	20	20	1.0	0	0	0	0	5	5
2264	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2265	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2266	1.0	0	0	0	0	1.0	0	0	0	0	0	0	1	1	1	1	1.0	0	0	0	0	0	0
2267	1.0	0	0	0	0	1.0	0	0	0	0	0	0	1	1	1	1	1.0	0	0	0	0	3	29
2270	1.0	1	1	2	2	1.0	0	0	1	1	0	0	0	0	3	3	1.0	0	0	0	0	3	7
2271	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2272	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	1	1	1.0	0	0	0	0	1	1
2273	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	1	1	1.0	0	0	0	0	0	0
2274	1.0	0	0	0	0	1.0	0	0	1	1	0	0	1	1	8	8	1.0	0	0	0	0	2	3
2275	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	1	1	1.0	0	0	0	0	0	0
2276	1.0	1	1	0	0	1.0	0	0	2	2	0	0	0	0	1	1	1.0	0	0	0	0	3	3
2277	1.0	0	0	0	0	1.0	0	0	0	0	0	0	1	1	1	1	1.0	0	0	0	0	4	19
2278	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	13	13	1.0	0	0	0	0	0	0
2279	1.0	5	5	1	1	1.0	0	0	0	0	0	0	0	0	1	1	1.0	0	0	0	0	6	14
2280	1.0	0	0	0	0	1.0	0	0	1	1	0	0	0	0	5	5	1.0	0	0	0	0	0	0
2281	1.0	0	0	0	0	1.0	0	0	0	0	2	2	0	0	3	3	1.0	0	0	0	0	0	0
2282	1.0	0	0	0	0	1.0	0	0	1	1	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2283	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	1	1	1.0	0	0	0	0	0	0
2291	1.0	0	0	0	0	1.0	0	0	0	0	0	0	1	1	5	5	1.0	0	0	0	0	0	0
2292	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2293	1.0	0	0	0	0	1.0	0	0	1	1	0	0	1	1	16	16	1.0	0	0	0	0	2	2
2294	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2295	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	4	4	1.0	0	0	0	0	1	1
2296	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	3	3	1.0	0	0	0	0	1	3
2297	1.0	0	0	0	0	1.0	0	0	0	0	1	1	0	0	1	1	1.0	0	0	0	0	0	0
2298	1.0	0	0	0	0	1.0	0	0	0	0	1	1	1	1	2	2	1.0	0	0	0	0	0	0
2299	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	6	6	1.0	0	0	0	0	0	0
2300	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	8	8	1.0	0	0	0	0	0	0
2301	1.0	0	0	0	0	1.0	0	0	0	0	1	1	1	1	9	9	1.0	0	0	0	0	0	0
2302	1.0	0	0	2	2	1.0	0	0	2	2	0	0	4	4	4	4	1.0	0	0	0	0	3	3
2303	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	1	1	1.0	0	0	0	0	1	1
2304	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	6	6	1.0	0	0	0	0	0	0
2305	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2306	1.0	0	0	0	0	1.0	0	0	0	0	0	0	1	1	2	2	1.0	0	0	0	0	0	0
2335	1.0	0	0	0	0	1.0	0	0	0	0	1	1	1	1	20	20	1.0	0	0	0	0	0	0
2336	1.0	0	0	0	0	1.0	0	0	0	0	1	1	1	1	0	0	1.0	0	0	0	0	0	0
2337	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2344	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2349	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	1	1
2350	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2351	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2352	1.0	0	0	0	0	1.0	0	0	0	0	0	0	1	1	0	0	1.0	0	0	0	0	0	0
2353	1.0	0	0	0	0	1.0	1	1	0	0	0	0	1	1	15	15	1.0	0	0	0	0	1	1

Sample	Table Feed	UTM		Garnet						Chromite						
											KIM		MEL?		OVL	
KAP-	(kg)	Easting	Northing	G10	G9	Meg	Ecl	Crst	KIM	N factor	R	N	R	N	R	N
2354	14.0	527572	5510988	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2355	16.9	528677	5506452	0	0	0	0	0	0	1.0	0	0	3	3	0	0
2356	12.0	529770	5504584	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2357	20.3	532433	5502860	0	0	0	0	0	0	1.0	0	0	1	1	0	0
2360	16.1	527673	5476199	0	0	0	0	0	0	1.0	0	0	2	2	0	0
2401	11.2	511329	5498566	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2402	15.5	514432	5497685	0	0	0	0	0	0	1.0	0	0	9	9	1	1
2403	14.3	521647	5490659	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2404	18.2	528232	5485016	0	0	0	0	0	0	4.0	0	0	18	72	1	4
2406	14.6	514906	5486860	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2407	17.8	520456	5486313	0	0	0	0	0	0	1.0	0	0	4	4	0	0
2408	14.2	523661	5483578	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2414	13.2	508968	5489862	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2415	13.8	513283	5494244	0	0	0	0	0	0	1.0	0	0	2	2	0	0
2416	11.1	513531	5508281	0	1	0	0	0	1	12.0	0	0	19	227	1	12
2417	18.3	521316	5507397	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2418	14.7	520058	5506026	0	1	0	0	0	1	8.2	2	16	22	180	7	57
2419	12.9	524351	5501224	0	0	0	0	0	0	1.0	0	0	0	0	0	0

Sample	Ilmenite					Cr-diopside											Olivine					Total KIMs	
		KIM		OTHER			KIM		GI		GII		GIII		GIV			KIM		OTHER			
KAP-	N factor	R	N	R	N	N factor	R	N	R	N	R	N	R	N	R	N	N factor	R	N	R	N	R	N
2354	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2355	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2356	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2357	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2360	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2401	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2402	1.0	0	0	0	0	1.0	1	1	2	2	3	3	2	2	20	20	1.0	0	0	0	0	1	1
2403	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	1	1	1.0	0	0	0	0	0	0
2404	1.0	0	0	3	3	1.0	0	0	0	0	1	1	0	0	1	1	1.0	0	0	0	0	0	0
2406	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2407	1.0	0	0	0	0	1.0	0	0	5	5	1	1	2	2	14	14	1.0	0	0	0	0	0	0
2408	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2414	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0
2415	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	3	3	1.0	0	0	0	0	0	0
2416	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	8	8	1.0	0	0	0	0	1	1
2417	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	1	1	1.0	0	0	0	0	0	0
2418	1.0	0	0	4	4	1.0	0	0	0	0	0	0	0	0	2	2	1.0	0	0	0	0	2	9
2419	1.0	0	0	0	0	1.0	0	0	0	0	0	0	0	0	0	0	1.0	0	0	0	0	0	0

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APPENDIX E: Metamorphic/Magmatic Massive Sulphide Indicator Minerals in 354 Modern Alluvium Samples from the Coral Rapids Area.

Summary of Abbreviations:

Ars:	Arsenopyrite
Ccp:	Chalcopyrite
ChrOVL:	Chromite from overlap compositional field
Cor:	Corundum
Fay:	Fayalite (Olivine)
Flo:	Florencite
Fluo:	Fluorite
GI:	Group I
GII:	Group II
GIII:	Group III
GIV:	Group IV
Gross:	Grossular garnet
Kg:	Kilogram
Ky:	Kyanite
Loell:	Loellingite
Mn epid:	Mn epidote
Mol:	Molybdenite
Mon:	Monazite
N:	Normalised
Oli Fo:	Forsterite (Olivine)
Opx:	Orthopyroxene
Pyr:	Pyrite
R:	Raw
Saph	Sapphirine
Sil:	Sillimanite
Spes:	Spessartine
St:	Staurolite
Tr:	Trace

Sample	Table	UTM		Sulphides						Spinel					Cr-Diopside									
KAP-	Feed (kg)	Easting	Northing	Cpy	Mol	Sph	Ars	Gal	Py	Gahnite MgO > 2%	Gahnite MgO < 2%	ChrOVL R	ChrOVL N	Spin	GI R	GI N	GII R	GII N	GIII R	GIII N	GIV R	GIV N	Pyx Total R	Pyx Total N
1523	13.4	512867	5497751	0	0	0	0	0	~10	0	0	4	5	0	1	1	2	2	1	1	5	5	9	9
1524	12.1	519965	5488523	2	0	0	0	0	4	0	0	0	0	0	2	2	1	1	0	0	0	0	3	3
1530	13.7	524642	5484443	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1
1631	13.8	461223	5539415	1	0	0	0	0	0	0	0	7	7	0	0	0	0	0	0	0	0	0	0	0
1632	12.1	460994	5540365	7	0	0	0	0	~1000	0	2	6	17	0	1	1	0	0	0	0	5	5	6	6
1633	12.6	459669	5541633	0	0	0	0	0	~9000	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0
1634	13.2	459377	5542612	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	1
1635	15.6	458833	5545312	0	0	0	0	0	~20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1636	15.4	458540	5548186	0	0	0	0	0	~150	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0
1637	15.1	456915	5549394	0	0	0	0	0	3	0	0	5	11	0	0	0	0	0	0	0	0	0	0	0
1638	14.4	456303	5553885	3	0	0	0	0	~15	0	0	7	14	0	0	0	0	0	0	0	0	0	0	0
1648	12.9	465188	5514230	0	0	0	0	0	5	0	1	0	0	0	1	1	1	1	1	1	1	1	4	4
1649	15.6	464825	5516574	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1650	14.3	464612	5517496	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1677	14.9	464441	5551227	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1678	15.5	465220	5550661	1	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2
1679	8.3	473015	5549327	0	0	0	0	0	~1300	0	0	3	3	0	1	1	0	0	0	0	0	0	1	1
1680	14.9	468630	5534859	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1681	15.2	464751	5532531	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1682	15.9	465930	5530018	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1683	11.5	464292	5547905	7	0	1	0	0	~1500	0	0	4	12	0	3	3	0	0	0	0	1	1	4	4
1684	13.0	459996	5546609	0	0	0	0	0	0	0	0	0	0	0	2	2	1	1	0	0	1	1	4	4
1685	14.6	483066	5540303	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1686	12.6	479382	5547099	0	0	0	0	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1687	17.2	478452	5548777	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1897	9.5	394819	5542085	0	1	0	1	0	~25	0	0	2	6	0	0	0	0	0	0	0	0	0	0	0
1910	14.0	406471	5544507	2	0	0	0	0	3	3	0	19	66	3	1	1	0	0	1	1	5	5	7	7
1911	11.8	410355	5548807	0	0	0	0	0	10	0	0	3	3	0	0	0	0	0	0	0	2	2	2	2
1912	15.7	393960	5553240	0	0	0	0	0	1	0	0	5	5	0	0	0	0	0	0	0	0	0	0	0
1913	16.4	401918	5553108	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1914	9.2	406052	5558071	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1
1915	7.2	402302	5563570	1	0	0	0	0	5	0	0	0	0	0	0	0	0	0	1	1	1	1	2	2
1916	9.5	398413	5565264	3	0	0	0	0	~250	0	1	7	7	1	0	0	0	0	0	0	3	3	3	3
1917	9.9	399395	5566291	2	0	0	0	0	~1500	0	0	2	2	0	0	0	0	0	0	0	2	2	2	2
1922	11.1	421055	5541086	4	0	0	0	0	~3000	0	0	6	12	1	0	0	0	0	1	1	2	2	3	3
1923	8.8	423011	5548355	3	2	0	0	0	~20000	3	1	35	153	0	0	0	0	0	0	0	2	2	2	2
1924	12.9	419954	5549411	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1925	9.7	430511	5558887	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1927	6.8	399871	5568056	0	0	0	0	0	~2500	0	0	10	16	0	0	0	0	0	0	0	0	0	0	0
1928	10.7	399353	5571069	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1929	10.5	401893	5576994	1	0	0	0	0	~20	0	0	0	0	1	0	0	1	1	1	1	3	3	5	5
1930	9.8	401955	5582145	2	0	0	0	0	~1500	0	0	29	77	0	0	0	0	0	0	0	0	0	0	0
1931	12.0	396177	5591422	7	0	0	0	0	~50	1	0	0	0	1	0	0	0	0	0	0	2	2	2	2
1932	11.6	411829	5592152	0	0	0	0	0	~50	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3

Sample	Corundum/Rutile				Silicates										Other		Carbonatite				
KAP-	Cor	Rub Cor	Saph Cor	Red Rutile	Cr-Gr/Uv	Cr-amph	Saph	Mn epid	% Spes	% Fay	% Opx	% Ky	% Sil	% St	Loell	Fluo	Bast	Per	Zirk	Par	Synch
1523	0	0	0	2	0	0	0	0	0	0	1	Tr	0	Tr	0	0	0	0	0	0	0
1524	0	0	0	1	0	0	0	0	0	0	2	0	0	Tr	0	0	0	0	0	0	0
1530	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
1631	0	0	0	0	0	0	0	1	0	0	2	Tr	0	0	0	0	0	0	0	0	0
1632	0	0	0	10	0	0	0	0	0	0	Tr	Tr	Tr	Tr	0	0	0	0	0	0	0
1633	0	0	0	0	0	0	0	0	0	0	Tr	Tr	0	0	1	5	0	0	1	0	0
1634	0	0	0	9	0	0	0	1	0	0	3	Tr	0	0	0	0	0	0	0	0	0
1635	0	0	0	0	0	0	0	0	Tr	0	1	Tr	0	0	0	0	0	0	0	0	0
1636	0	0	0	1	0	0	1	1	0	0	Tr	Tr	0	0	0	0	0	0	0	0	0
1637	0	0	0	0	0	0	0	0	Tr	Tr	1	Tr	Tr	0	0	0	0	0	0	0	0
1638	0	0	0	0	0	0	0	0	Tr	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0
1648	0	0	0	0	2	0	0	0	0	Tr	1	0	0	0	0	0	0	0	0	0	0
1649	0	0	0	0	0	0	0	0	0	0	25	0	0	0	0	0	0	0	0	0	0
1650	0	0	0	0	0	0	0	0	0	0	20	Tr	0	Tr	0	0	0	0	0	0	0
1677	0	1	0	0	0	0	0	0	0	0	15	Tr	0	Tr	0	0	1	0	0	0	0
1678	0	0	0	0	0	0	0	0	0	0	5	Tr	0	Tr	0	0	0	0	0	0	0
1679	0	0	0	0	0	0	0	0	0	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0
1680	0	0	0	0	0	0	0	0	Tr	0	2	Tr	0	0	0	0	0	0	0	0	0
1681	0	0	0	0	0	0	0	0	0	0	10	0.5	0	Tr	0	0	0	0	0	0	0
1682	0	0	0	0	0	0	0	0	0	0	4	Tr	0	0	0	0	0	0	0	0	0
1683	0	1	0	0	0	0	0	0	0	0	Tr	Tr	Tr	Tr	10	0	0	0	0	0	0
1684	0	0	0	0	0	0	0	0	0	0	12	Tr	0	Tr	0	0	0	0	0	0	0
1685	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
1686	0	0	0	0	0	0	0	0	0	0	0	Tr	0	Tr	0	0	0	0	0	0	0
1687	0	0	0	0	0	0	0	0	0	0	8	Tr	0	Tr	0	0	0	0	0	0	0
1897	0	0	0	0	0	0	0	0	0	0	3	Tr	0	Tr	0	0	0	0	0	0	0
1910	0	4	0	2	0	0	0	1	0	0	2	3	Tr	3	0	0	0	4	0	0	0
1911	0	0	0	0	0	0	0	0	0	0	1	1	0.5	Tr	0	0	0	0	0	0	0
1912	0	0	0	0	0	0	0	0	0	0	1	0.5	Tr	1	0	0	0	0	0	0	0
1913	0	0	0	0	0	0	0	1	0	0	5	2	Tr	0.5	0	0	0	0	0	0	0
1914	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
1915	0	0	0	0	0	0	0	0	Tr	0	2	0.5	Tr	2	0	0	0	0	0	0	0
1916	0	0	0	1	0	0	0	0	Tr	0	1	2	Tr	1	0	10	0	0	0	0	0
1917	0	0	0	0	0	0	0	0	Tr	0	2	Tr	Tr	0.5	0	0	0	0	0	0	0
1922	0	1	0	4	0	0	0	1	0	0	3	0.5	Tr	1	0	14	0	0	0	0	0
1923	0	0	0	5	0	0	0	0	0	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0
1924	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0
1925	0	0	0	0	0	0	0	0	0	0	Tr	0	0	0	0	0	0	0	0	0	0
1927	0	0	0	0	0	0	0	0	Tr	0	0.5	Tr	Tr	Tr	0	4	0	0	0	0	0
1928	0	0	0	0	0	0	0	0	0	0	3	0	0	Tr	0	0	0	0	0	0	0
1929	0	0	0	0	0	0	0	0	0	0	Tr	0.5	Tr	2	0	0	0	0	0	0	0
1930	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
1931	0	0	0	2	0	0	0	0	0	0	3	1	Tr	2	0	0	0	0	0	0	0
1932	0	0	0	0	0	0	0	0	Tr	0	7	1	Tr	2	0	0	0	0	0	0	0

Sample	Table	UTM		Sulphides						Spinel					Cr-Diopside									
KAP-	Feed (kg)	Easting	Northing	Cpy	Mol	Sph	Ars	Gal	Py	Gahnite MgO > 2%	Gahnite MgO < 2%	ChrOVL R	ChrOVL N	Spin	GI R	GI N	GII R	GII N	GIII R	GIII N	GIV R	GIV N	Pyx Total R	Pyx Total N
1933	8.1	405990	5588735	1	0	0	0	0	~50	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0
1934	7.9	406290	5582250	7	1	0	0	0	~1000	0	0	0	0	1	0	0	0	0	0	0	3	3	3	3
1936	7.1	425795	5571040	0	0	0	0	0	1	3	0	13	78	0	0	0	0	0	0	0	3	3	3	3
1937	10.4	432029	5577391	2	0	0	0	0	~30	0	1	11	22	0	2	2	1	1	0	0	0	0	3	3
1938	8.8	439838	5588640	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1939	8.8	446174	5588884	1	0	0	0	0	~100	0	0	8	16	0	1	1	0	0	0	0	0	0	1	1
1940	11.2	436218	5574353	17	0	13	0	0	~150	4	1	27	67	1	1	1	1	1	0	0	4	4	6	6
1941	12.1	438027	5577933	2	0	0	0	0	~50	1	0	2	5	0	0	0	0	0	0	0	0	0	0	0
1942	8.1	420877	5566515	2	0	0	0	0	~1000	0	0	3	5	0	0	0	0	0	0	0	0	0	0	0
1943	10.0	422806	5557467	1	0	0	0	0	~3000	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0
1944	13.2	435036	5552307	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1961	13.1	401666	5544566	0	0	0	0	0	25	0	0	2	2	1	0	0	0	0	0	0	1	1	1	1
1962	12.1	401689	5544647	0	0	0	0	0	~50	1	2	26	38	0	0	0	0	0	0	0	1	1	1	1
1963	9.2	397547	5547477	1	0	0	0	0	~300	0	0	8	15	1	1	1	0	0	0	0	0	0	1	1
1964	13.9	397690	5547585	0	2	0	0	0	~500	4	1	9	23	10	0	0	0	0	1	1	4	4	5	5
1965	11.8	401098	5553925	2	0	0	0	0	~300	0	0	17	60	3	1	1	0	0	0	0	11	11	12	12
1966	10.2	401151	5553987	1	0	0	0	0	~100	1	0	19	37	0	0	0	0	0	0	0	0	0	0	0
1967	13.5	403606	5551931	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
1968	7.8	403106	5559836	2	0	0	0	0	Tr	0	2	14	26	1	1	1	0	0	0	0	1	1	2	2
1969	9.1	400292	5564712	4	0	0	0	0	~500	5	0	35	139	7	0	0	0	0	0	0	1	1	1	1
1970	14.7	394536	5563145	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1974	13.3	427067	5546684	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1975	10.4	422829	5548412	1	1	0	0	0	~3000	0	0	17	31	0	0	0	0	0	0	0	0	0	0	0
1976	12.1	422449	5554489	~60	2	0	0	0	~10000	1	0	5	10	0	1	1	1	1	1	1	2	2	5	5
1977	13.6	423982	5559480	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1978	11.9	422324	5559430	23	2	0	0	1	~10000	5	1	49	1154	0	0	0	0	0	0	0	4	4	4	4
1979	12.1	421881	5566345	~30	0	0	0	0	~20000	17	3	28	933	0	0	0	0	0	0	0	2	2	2	2
1980	13.2	399853	5570666	~12	1	0	0	0	~800	8	1	12	132	9	0	0	1	1	1	1	7	7	9	9
1981	16.8	399836	5570680	3	0	0	0	0	~20	0	0	10	14	0	1	1	0	0	0	0	0	0	1	1
1982	10.5	401405	5576845	7	0	0	4	2	~6000	0	0	17	47	0	0	0	0	0	0	0	0	0	0	0
1983	14.0	402468	5581698	10	0	0	0	0	~80	3	0	9	25	0	1	1	0	0	3	3	5	5	9	9
1984	13.7	398618	5585164	0	0	0	0	0	~3000	0	0	7	18	2	0	0	0	0	0	0	3	3	3	3
1985	12.3	416782	5595070	11	0	0	2	2	~7000	1	0	1	2	3	0	0	0	0	0	0	5	5	5	5
1986	8.8	416628	5593876	5	0	0	0	0	~20	0	0	0	0	0	0	0	0	0	1	1	6	6	7	7
1987	13.2	409354	5590692	1	0	0	0	0	~20	0	0	0	0	0	0	0	1	1	0	0	1	1	2	2
1988	16.3	407319	5590677	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1989	7.2	406778	5588589	3	0	0	1	0	2	0	2	6	15	0	0	0	0	0	1	1	1	1	2	2
1990	11.9	408668	5579045	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1991	13.6	429422	5576887	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	9.2	438205	5581155	2	0	0	0	0	~2000	2	0	49	124	0	0	0	0	0	0	0	2	2	2	2
1993	9.7	439651	5581691	4	0	0	0	0	~30	2	0	40	240	0	0	0	0	0	0	0	0	0	0	0
1994	11.1	444815	5584596	20	0	0	0	0	~4000	16	4	26	560	1	0	0	0	0	1	1	3	3	4	4
1995	13.3	451776	5595894	3	0	0	0	0	~200	1	0	10	10	0	1	1	0	0	1	1	0	0	2	2
1996	14.5	434300	5569701	0	0	0	1	1	~5000	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0

Sample	Corundum/Rutile				Silicates										Other		Carbonatite				
KAP-	Cor	Rub Cor	Saph Cor	Red Rutile	Cr-Gr/Uv	Cr-amph	Saph	Mn epid	% Spes	% Fay	% Opx	% Ky	% Sil	% St	Loell	Fluo	Bast	Per	Zirk	Par	Synch
1933	0	0	0	0	0	0	0	0	Tr	0	4	1	Tr	2	0	0	0	0	0	0	0
1934	0	0	0	0	0	0	0	0	0	0	Tr	0.5	0	Tr	0	3	0	0	0	0	0
1936	0	0	0	6	0	0	0	0	Tr	0	3	Tr	Tr	1	0	1	0	0	0	0	0
1937	0	0	0	0	0	0	0	0	Tr	0	Tr	0.5	Tr	Tr	0	0	0	0	0	0	0
1938	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1939	0	0	0	0	0	0	0	0	0	0	Tr	0	0	Tr	0	0	0	0	0	0	0
1940	0	2	2	1	0	0	0	0	Tr	0	Tr	Tr	Tr	Tr	0	0	0	0	0	0	0
1941	0	1	0	0	0	0	0	0	Tr	0	Tr	Tr	Tr	Tr	0	0	0	0	0	0	0
1942	0	0	1	2	0	0	0	1	Tr	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0
1943	0	0	0	1	0	0	0	0	0	0	1	0.5	0.5	1	0	2	0	0	0	0	0
1944	0	0	0	0	0	0	0	0	0	0	8	Tr	Tr	Tr	0	0	0	0	0	0	0
1961	0	1	0	0	0	0	0	0	0	0	3	0.5	Tr	0.5	0	0	0	0	0	0	0
1962	0	0	0	5	0	0	0	0	0	0	Tr	Tr	Tr	1	0	0	0	0	0	0	0
1963	0	0	0	1	0	0	0	0	Tr	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	Tr	0	1	Tr	Tr	2	0	0	0	0	0	0	0
1965	0	2	0	2	0	0	0	1	0	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0
1966	0	0	0	0	1	0	0	1	0	0	Tr	Tr	Tr	Tr	0	1	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	15	Tr	Tr	1	0	1	0	0	0	0	0
1968	0	0	1	1	0	1	0	0	Tr	0	2	Tr	0	0.5	0	0	0	0	0	0	0
1969	0	1	0	0	0	0	0	0	Tr	0	Tr	0.5	Tr	0.5	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	Tr	0	Tr	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0	7	Tr	0	Tr	0	0	0	0	0	0	0
1975	0	0	0	4	0	0	0	0	0	0	2	Tr	Tr	Tr	0	2	0	0	0	0	0
1976	0	0	0	2	1	0	0	0	0	0	1	0	0	Tr	0	3	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	1	0	0	0	0	0	0	0	0	2	Tr	0	0	2	9	0	0	0	0	0
1979	0	0	0	0	0	0	0	0	0	0	1	Tr	Tr	Tr	0	2	0	0	0	0	0
1980	0	2	0	2	0	0	0	0	0	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0
1981	0	0	0	7	0	0	0	0	0	0	2	0.5	0	Tr	0	1	0	0	0	0	0
1982	0	0	1	0	0	0	0	0	Tr	0	Tr	Tr	Tr	Tr	1	0	0	0	0	0	0
1983	0	3	0	0	1	0	0	0	0	0	Tr	2	Tr	Tr	0	0	0	0	0	0	0
1984	0	0	0	1	0	0	0	0	0	0	3	Tr	0	Tr	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	Tr	0	Tr	Tr	Tr	Tr	0	16	0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0	Tr	0.5	0.5	Tr	0	3	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	2	0.5	0	1	0	2	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	1	1	0	0	0	0	0	0	0	1	Tr	0	Tr	0	1	0	0	0	0	0
1990	0	0	0	0	0	0	0	0	0	0	1	Tr	0	Tr	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0	0	0	2	Tr	0	0	0	0	0	0	0	0	0
1992	0	0	0	2	0	0	0	0	0	0	1	Tr	0	Tr	0	0	0	0	0	0	0
1993	0	2	0	0	0	0	0	2	Tr	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0
1994	0	1	0	0	0	0	0	0	0	0	Tr	Tr	Tr	Tr	0	2	0	0	0	0	0
1995	0	0	0	0	0	0	0	0	0	0	Tr	Tr	0	Tr	0	1	0	0	0	0	0
1996	0	0	0	0	0	0	0	0	0	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0

Sample	Table	UTM		Sulphides						Spinel					Cr-Diopside									
KAP-	Feed (kg)	Easting	Northing	Cpy	Mol	Sph	Ars	Gal	Py	Gahnite MgO > 2%	Gahnite MgO < 2%	ChrOVL R	ChrOVL N	Spin	GI R	GI N	GII R	GII N	GIII R	GIII N	GIV R	GIV N	Pyx Total R	Pyx Total N
1997	7.6	424245	5567059	0	0	0	0	0	~300	0	0	8	34	0	0	0	0	0	0	0	2	2	2	2
1998	9.2	424700	5559703	9	0	0	0	0	~2000	0	0	3	6	0	0	0	0	0	2	2	4	4	6	6
1999	13.8	413355	5557753	84	12	0	1	0	~40	27	5	46	202	0	2	2	2	2	3	3	0	0	7	7
2000	14.1	438733	5552120	1	0	0	0	0	~40	3	0	9	18	1	1	1	0	0	1	1	2	2	4	4
2003	11.4	437282	5541156	1	0	0	0	0	0	1	1	7	18	2	0	0	0	0	0	0	1	1	1	1
2004	11.0	435729	5540763	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2037	12.3	459086	5539256	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2039	9.4	466633	5534563	4	0	0	0	0	~50	0	0	3	8	1	2	2	0	0	1	1	6	6	9	9
2041	8.7	457069	5539514	2	0	0	0	0	2	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0
2043	16.4	469593	5534222	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2044	15.2	472319	5533579	0	0	0	0	0	~300	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0
2045	16.9	474077	5534369	0	0	0	0	0	5	0	0	0	0	0	1	1	0	0	1	1	0	0	2	2
2046	13.1	473939	5535175	18	0	0	1	0	~10000	0	0	4	15	0	1	1	1	1	1	1	3	3	6	6
2047	15.2	470267	5534266	0	0	0	0	0	~10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2048	13.3	472841	5533678	0	0	0	0	0	~4000	0	0	2	2	0	1	1	0	0	1	1	0	0	2	2
2049	9.5	477355	5538207	1	0	0	0	0	4	0	0	1	2	0	2	2	0	0	1	1	4	4	7	7
2050	7.1	481721	5530323	1	0	0	0	0	~15	0	0	2	3	0	1	1	0	0	4	4	0	0	5	5
2051	5.5	484405	5526180	0	0	0	0	0	5	0	0	5	8	0	2	2	0	0	1	1	0	0	3	3
2052	11.1	487363	5523030	2	0	0	0	0	0	0	0	0	0	1 Cr	3	3	0	0	1	1	5	5	9	9
2053	8.5	489214	5520199	2	0	0	0	0	~15	0	0	6	10	0	0	0	0	0	0	0	0	0	0	0
2054	14.0	492147	5513357	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2055	12.1	496164	5512109	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2056	10.0	498950	5509544	3	0	0	0	0	~15	0	0	8	27	0	0	0	0	0	0	0	0	0	0	0
2057	17.4	508372	5495381	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2058	11.2	509697	5496613	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2059	10.6	506934	5499538	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	3	3	4	4
2060	9.4	507088	5501291	3	0	0	0	0	~40	0	0	10	20	0	1	1	0	0	3	3	11	11	15	15
2061	17.1	478941	5533410	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2062	12.3	481525	5528256	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0
2063	12.3	485349	5525501	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	2	2	4	4
2064	8.5	488719	5522103	1	0	0	0	0	~600	0	0	6	13	0	0	0	0	0	1	1	0	0	1	1
2065	7.9	489617	5515173	0	0	0	0	0	~3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2066	9.3	494866	5513289	0	0	0	0	0	1	0	0	2	3	0	1	1	0	0	0	0	0	0	1	1
2067	9.2	497420	5510644	0	0	0	0	0	5	0	0	4	19	0	0	0	0	0	0	0	3	3	3	3
2068	10.9	501087	5505848	0	0	0	0	0	13	0	0	0	0	0	0	0	0	0	1	1	10	10	11	11
2069	10.5	508652	5498290	1	0	0	0	0	~25	0	0	2	2	0	0	0	0	0	1	1	1	1	2	2
2070	11.1	506934	5500167	2	2	0	0	0	~40	0	0	16	103	0	2	2	0	0	1	1	3	3	6	6
2071	10.2	506843	5502868	4	0	0	0	0	~40	0	0	14	14	0	5	5	0	0	2	2	11	11	18	18
2072	14.3	504012	5505259	0	0	0	0	0	~20	0	0	1	3	0	2	2	0	0	0	0	0	0	2	2
2073	13.7	502318	5505747	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2074	8.8	509301	5514300	1	0	0	0	0	~800	0	0	2	3	0	0	0	0	0	0	0	0	0	0	0
2081	12.5	465205	5520088	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2082	12.2	509341	5514995	12	1	0	0	0	~50	0	1	4	17	2	0	0	1	1	0	0	2	2	3	3
2083	10.0	509033	5516530	11	0	0	0	0	200	0	0	3	9	0	0	0	1	1	1	1	2	2	4	4

Sample	Corundum/Rutile				Silicates										Other		Carbonatite				
KAP-	Cor	Rub Cor	Saph Cor	Red Rutile	Cr-Gr/Uv	Cr-amph	Saph	Mn epid	% Spes	% Fay	% Opx	% Ky	% Sil	% St	Loell	Fluo	Bast	Per	Zirk	Par	Synch
1997	0	1	0	0	0	0	0	0	0	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0
1998	0	0	0	0	0	0	1	1	0	0	Tr	Tr	0	Tr	0	2	0	0	0	0	0
1999	0	0	0	3	0	0	0	0	0	0	0	Tr	0	0	0	0	0	0	0	0	0
2000	0	1	0	1	0	0	0	1	0	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0
2003	0	2	1	0	0	0	0	0	0	0	4	5	0	3	0	0	0	1	0	0	0
2004	0	0	0	0	0	0	0	0	0	0	Tr	0	0	Tr	0	0	0	0	0	0	0
2037	0	0	0	0	0	0	0	0	0	0	10	Tr	0	1	0	0	0	0	0	0	0
2039	0	0	0	0	1	0	0	0	Tr	0	Tr	Tr	0	0	0	0	0	0	0	0	0
2041	0	0	0	0	0	0	0	0	0	0	25	2	Tr	0	0	0	0	0	0	0	0
2043	0	0	0	0	0	0	0	0	0	0	2	0	Tr	0	0	0	0	0	0	0	0
2044	0	0	0	0	1	0	0	0	0	0	Tr	0	Tr	0	0	0	0	0	0	0	0
2045	0	0	0	0	0	0	0	0	0	0	Tr	Tr	Tr	Tr	0	0	0	0	0	0	0
2046	0	0	0	0	0	0	0	0	0	0	4	Tr	Tr	Tr	0	6	0	0	0	0	1
2047	0	0	0	0	0	0	0	0	0	0	3	Tr	Tr	Tr	0	0	0	0	0	0	0
2048	0	1	0	0	0	0	0	0	0	0	Tr	Tr	Tr	Tr	0	7	0	0	0	0	0
2049	0	0	0	0	0	0	0	0	Tr	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0
2050	0	0	0	0	0	0	0	0	0	0	Tr	Tr	Tr	Tr	0	0	0	0	0	0	0
2051	0	0	0	0	0	0	0	0	0	0	Tr	Tr	Tr	Tr	0	0	0	0	0	0	0
2052	0	0	0	0	0	0	0	0	0	0	Tr	Tr	0	0	0	0	0	0	0	0	0
2053	0	0	0	0	0	0	0	0	0	0	Tr	Tr	Tr	0	0	0	0	0	0	0	0
2054	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2055	0	0	0	0	0	0	0	0	0	0	7	0	Tr	Tr	0	0	0	0	0	0	0
2056	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
2057	0	0	0	0	0	0	0	0	0	0	Tr	Tr	0	0	0	0	0	0	0	0	0
2058	0	0	0	0	0	0	0	0	0	0	Tr	0	0	0	0	0	0	0	0	0	0
2059	0	0	0	0	0	0	0	0	0	0	2	Tr	0	Tr	0	0	0	0	0	0	0
2060	0	0	0	1	0	0	0	1	0	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0
2061	0	0	0	0	0	0	0	0	0	0	5	Tr	0	Tr	0	0	0	0	0	0	0
2062	0	0	0	0	0	0	0	0	0	0	Tr	Tr	Tr	Tr	0	0	0	0	0	0	0
2063	0	0	0	0	0	0	0	0	0	0	4	Tr	0	Tr	0	0	0	0	0	0	0
2064	0	0	0	0	0	0	0	0	0	0	3	Tr	Tr	Tr	0	0	0	0	0	0	0
2065	0	0	0	0	0	0	0	0	0	0	2	Tr	0	Tr	0	0	0	0	0	0	0
2066	0	0	0	0	0	0	0	0	0	0	3	Tr	Tr	Tr	0	0	0	0	0	0	0
2067	0	0	0	0	0	0	0	0	0	0	0	Tr	0	Tr	0	0	0	0	0	0	0
2068	0	0	0	0	0	0	0	0	0	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0
2069	0	0	0	0	0	0	0	0	0	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0
2070	0	0	0	0	1	0	0	0	0	0	1	0	Tr	0	0	0	0	0	0	0	0
2071	0	0	0	0	0	0	0	1	Tr	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0
2072	0	0	0	0	0	0	0	0	0	0	2	Tr	0	Tr	0	0	0	0	0	0	0
2073	0	0	0	0	0	0	0	0	0	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0
2074	0	1	0	0	0	0	0	0	0	0	2	Tr	0	Tr	0	3	0	0	0	0	0
2081	0	0	0	0	0	0	0	0	0	0	35	Tr	0	Tr	0	0	0	0	0	0	0
2082	0	0	0	0	1	0	0	0	0	0	3	Tr	0	Tr	0	0	0	0	0	0	0
2083	0	0	0	0	0	0	0	0	Tr	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0

Sample	Table	UTM		Sulphides						Spinel					Cr-Diopside									
KAP-	Feed (kg)	Easting	Northing	Cpy	Mol	Sph	Ars	Gal	Py	Gahnite MgO > 2%	Gahnite MgO < 2%	ChrOVL R	ChrOVL N	Spin	GI R	GI N	GII R	GII N	GIII R	GIII N	GIV R	GIV N	Pyx Total R	Pyx Total N
2084	12.0	509963	5494064	0	0	0	0	0	~15	0	0	1	2	0	0	0	0	0	0	0	6	6	6	6
2085	16.7	506653	5518142	0	0	0	0	0	~100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2086	9.3	506610	5518072	20	0	0	2	0	~8000	1	0	8	31	0	0	0	0	0	2	2	4	4	6	6
2087	12.0	504267	5503457	2	1	0	0	0	~30	1	0	5	94	0	1	1	0	0	2	2	1	1	4	4
2088	13.4	503844	5503747	0	0	0	0	0	11	0	0	3	5	1	3	3	0	0	1	1	19	19	23	23
2089	12.7	502524	5505492	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	1	2	2
2090	11.3	510778	5512509	11	0	0	1	0	~10000	0	0	6	79	1	0	0	0	0	1	1	2	2	3	3
2094	9.6	503101	5519662	12	0	0	0	0	~100	0	0	7	64	2	0	0	0	0	0	0	3	3	3	3
2095	12.0	501707	5519969	5	0	0	0	0	7	0	0	4	6	0	1	1	2	2	0	0	18	18	21	21
2096	12.9	502284	5523948	0	1	0	0	0	~20	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1
2097	9.5	501651	5527279	0	0	0	0	0	~150	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0
2098	10.1	498116	5533502	4	0	0	0	0	3	0	1	1	4	0	0	0	0	0	2	2	1	1	3	3
2099	11.5	494348	5535251	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	2	2	3	3
2100	13.0	493956	5540988	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2101	12.2	475553	5544162	0	1	0	0	0	5	0	0	7	22	2	2	2	2	2	1	1	1	1	6	6
2103	10.0	473493	5547560	1	0	0	0	0	5	0	0	1	3	0	1	1	0	0	0	0	6	6	7	7
2104	9.4	470671	5555602	1	0	0	0	0	~20	0	1	2	14	0	11	11	0	0	0	0	2	2	13	13
2105	9.7	468281	5558536	4	1	0	0	0	~300	0	0	2	2	0	1	1	1	1	4	4	16	16	22	22
2106	10.5	454579	5590358	0	0	0	0	0	~20	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0
2107	6.8	451493	5579407	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2108	11.5	449465	5573011	0	0	0	1	0	~40	0	0	12	23	0	3	3	0	0	0	0	0	0	3	3
2109	11.1	471315	5562100	7	0	0	0	0	~40	1	0	7	33	0	0	0	1	1	0	0	1	1	2	2
2110	10.2	468090	5565385	2	0	0	1	0	~150	0	0	3	4	0	1	1	1	1	5	5	5	5	12	12
2111	9.4	466819	5568027	1	0	0	0	0	~300	0	0	7	31	0	2	2	1	1	1	1	1	1	5	5
2112	13.0	467121	5573043	5	0	0	0	0	~4000	0	0	3	6	0	1	1	0	0	1	1	2	2	4	4
2113	10.3	469223	5573725	7	0	0	2	0	~3500	1	0	5	58	0	0	0	0	0	1	1	4	4	5	5
2114	8.4	471858	5568036	4	0	0	0	0	~300	0	0	7	9	0	0	0	0	0	1	1	5	5	6	6
2115	10.1	474272	5563333	1	0	0	1	0	~1000	0	0	5	15	0	1	1	0	0	2	2	3	3	6	6
2116	13.3	476010	5558054	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	1	10	14	12	17
2117	12.4	449484	5572997	0	0	0	0	0	4	1	0	7	12	1	0	0	0	0	0	0	1	1	1	1
2118	13.9	448220	5566309	12	0	0	0	0	~30	0	1	5	23	1	2	2	0	0	2	2	6	6	10	10
2119	10.8	446527	5549826	0	0	0	0	0	5	0	0	0	0	0	0	0	1	1	0	0	0	0	1	1
2120	12.8	446078	5547612	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	1	1	13	13	14	14
2121	9.2	452831	5568080	9	0	0	8	1	~5000	0	0	20	43	0	0	0	0	0	0	0	0	0	0	0
2122	11.6	455648	5574204	~60	0	0	0	0	~75	1	0	56	2625	0	4	4	1	1	3	3	1	1	9	9
2123	6.4	457190	5576412	33	0	0	0	0	7	1	0	0	0	0	5	5	0	0	6	6	8	8	19	19
2124	10.1	459856	5583521	15	0	0	1	0	~9000	0	0	3	7	0	0	0	0	0	0	0	1	1	1	1
2125	14.2	461286	5588835	27	0	0	0	0	~500	0	0	0	0	1	5	5	0	0	13	13	2	2	20	20
2126	9.2	460492	5590876	3	0	0	0	0	~1000	2	0	17	74	1	3	3	0	0	1	1	4	4	8	8
2127	14.1	467314	5599621	0	0	0	0	0	~15	0	0	5	5	0	0	0	0	0	0	0	0	0	0	0
2128	11.0	463883	5586120	0	0	0	0	0	2	0	0	4	6	0	2	2	0	0	2	2	5	5	9	9
2129	9.8	465193	5579205	2	0	0	0	0	~1000	3	1	5	17	1	2	2	2	2	2	2	2	2	8	8
2130	15.1	464954	5579027	2	0	0	0	0	3	0	0	1	2	2	3	3	0	0	1	1	0	0	4	4
2131	11.7	455601	5556416	1	0	0	0	0	~25	0	0	0	0	0	1	1	0	0	0	0	3	3	4	4

Sample	Corundum/Rutile				Silicates										Other		Carbonatite				
KAP-	Cor	Rub Cor	Saph Cor	Red Rutile	Cr-Gr/Uv	Cr-amph	Saph	Mn epid	% Spes	% Fay	% Opx	% Ky	% Sil	% St	Loell	Fluo	Bast	Per	Zirk	Par	Synch
2084	0	0	0	0	0	0	0	0	Tr	0	Tr	0	Tr	Tr	0	0	0	0	0	0	0
2085	0	0	0	0	0	0	0	0	0	0	Tr	Tr	0	Tr	0	1	0	0	0	0	0
2086	0	0	0	0	0	0	0	0	0	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0
2087	0	0	0	0	0	0	0	0	Tr	0	Tr	Tr	Tr	4	0	0	0	0	0	0	0
2088	0	0	0	0	0	0	0	0	0	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0
2089	0	0	0	0	0	0	0	0	0	0	5	Tr	Tr	Tr	0	0	0	0	0	0	0
2090	0	0	0	0	0	0	0	0	0	0	Tr	Tr	Tr	Tr	0	0	0	0	0	0	0
2094	0	1	1	10	0	0	0	0	0	0	Tr	0	Tr	Tr	0	0	0	0	0	0	0
2095	0	0	0	0	0	0	0	0	0	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0
2096	0	0	0	0	0	0	0	0	0	0	0.5	Tr	0	Tr	0	0	0	0	0	0	0
2097	0	0	0	0	0	0	0	0	0	0	Tr	Tr	0	Tr	1	0	0	0	0	0	0
2098	0	1	0	0	0	0	0	0	0	0	2	Tr	0	Tr	0	0	0	0	0	0	0
2099	0	0	0	0	0	0	0	0	0	0	3	Tr	0	Tr	0	0	0	0	0	0	0
2100	0	0	0	0	0	0	0	0	0	0	Tr	0	0	0	0	0	0	0	0	0	0
2101	0	1	0	1	0	0	0	0	0	0	0	Tr	Tr	0	0	0	0	0	0	0	0
2103	0	0	0	0	0	0	0	0	0	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0
2104	0	0	0	0	0	0	0	0	0	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0
2105	0	0	0	1	0	0	0	1	0	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0
2106	0	0	0	0	0	0	0	0	0	0	5	1	Tr	0.5	0	0	0	0	0	0	0
2107	0	0	0	0	0	0	0	0	0	0	3	Tr	0	1	0	0	0	0	0	0	0
2108	1	2	0	0	0	0	0	0	0	0	0.5	Tr	0	1	0	0	0	0	0	0	0
2109	0	0	0	7	0	0	0	0	Tr	0	Tr	Tr	Tr	Tr	0	0	0	0	0	0	0
2110	0	1	0	0	0	0	0	0	0	0	Tr	Tr	Tr	Tr	0	1	0	0	0	0	0
2111	0	0	0	0	0	0	0	0	Tr	0	Tr	Tr	Tr	Tr	0	0	0	0	0	0	0
2112	0	0	0	0	0	0	0	0	0	0	1	0.5	Tr	Tr	0	0	0	0	0	0	0
2113	0	0	0	3	0	0	0	0	Tr	0	Tr	Tr	Tr	Tr	0	0	0	0	0	0	0
2114	0	0	0	0	0	0	0	0	Tr	0	0.5	Tr	0	Tr	0	0	0	0	0	0	0
2115	0	1	0	0	0	0	0	1	0	0	2	Tr	Tr	Tr	0	0	0	0	0	0	0
2116	0	0	0	0	0	0	0	0	0	0	0.5	Tr	0	Tr	0	0	0	0	0	0	0
2117	0	0	0	28	0	0	0	0	0	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0
2118	0	2	0	2	0	0	0	0	Tr	0	Tr	Tr	1	0.5	0	0	0	0	0	0	0
2119	0	0	0	0	0	0	0	0	0	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0
2120	0	0	0	0	0	0	0	0	0	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0
2121	0	0	0	0	0	0	0	0	0	0	Tr	Tr	Tr	0.5	0	0	0	0	0	0	0
2122	0	0	0	0	0	0	0	0	0	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0
2123	0	0	0	0	0	0	0	0	0	0	Tr	Tr	0	Tr	0	2	0	0	0	0	0
2124	0	0	0	1	0	0	0	0	0	0	Tr	Tr	Tr	2	0	0	0	0	0	0	0
2125	0	0	0	0	0	0	0	0	0	0	Tr	0.5	Tr	Tr	0	4	0	0	0	0	0
2126	0	0	0	15	0	0	1	0	0	0	Tr	Tr	Tr	Tr	0	2	0	0	0	0	0
2127	0	1	0	0	0	0	1	0	0	0	Tr	Tr	Tr	Tr	0	1	0	0	0	0	0
2128	0	1	0	0	0	0	0	0	0	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0
2129	0	0	0	2	1	0	0	0	0	0	Tr	Tr	Tr	Tr	0	0	0	0	0	0	0
2130	0	0	0	0	0	0	0	0	0	0	5	Tr	0.5	Tr	0	0	0	0	0	0	0
2131	0	0	0	0	0	0	0	0	0	0	Tr	Tr	Tr	Tr	0	0	0	0	0	0	0

Sample	Table	UTM		Sulphides						Spinel					Cr-Diopside									
KAP-	Feed (kg)	Easting	Northing	Cpy	Mol	Sph	Ars	Gal	Py	Gahnite MgO > 2%	Gahnite MgO < 2%	ChrOVL R	ChrOVL N	Spin	GI R	GI N	GII R	GII N	GIII R	GIII N	GIV R	GIV N	Pyx Total R	Pyx Total N
2132	15.1	459525	5543301	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	2	2
2133	7.8	483954	5574831	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2134	11.4	482464	5585415	3	0	0	0	0	3	0	0	1	2	0	2	2	0	0	1	1	2	2	5	5
2135	11.8	480199	5591870	3	0	0	0	0	~400	0	0	2	2	1	4	4	0	0	3	3	0	0	7	7
2136	9.6	491966	5593994	0	0	0	0	0	~3000	0	0	5	27	0	2	2	0	0	0	0	5	5	7	7
2137	12.5	492489	5590566	0	0	0	0	0	2	0	0	0	0	1	1	1	0	0	0	0	3	3	4	4
2138	14.4	493734	5586833	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	1
2139	12.6	496550	5587419	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	9	9	10	10
2140	10.0	493330	5580379	1	0	0	0	0	~1000	0	0	3	14	0	0	0	0	0	0	0	2	2	2	2
2141	11.1	490787	5576907	8	0	0	0	0	~20	0	0	2	6	0	1	1	0	0	3	3	1	1	5	5
2142	9.6	490512	5574226	0	0	0	0	0	7	0	0	2	3	0	1	1	0	0	3	3	10	10	14	14
2143	10.0	494420	5543651	0	0	0	0	0	~25	0	0	1	3	0	1	1	0	0	0	0	4	4	5	5
2144	13.1	497176	5545750	0	1	0	0	0	5	0	0	0	0	0	0	0	1	1	0	0	0	0	1	1
2145	10.2	496807	5548535	1	1	0	0	0	~200	0	0	1	2	0	0	0	1	1	1	1	5	5	7	7
2146	10.8	496977	5552792	0	0	0	0	0	5	2	0	3	51	0	1	1	0	0	1	1	0	0	2	2
2147	12.5	496991	5554835	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2148	12.4	495844	5557358	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2149	7.9	497385	5561625	1	0	0	0	0	~1800	0	0	3	25	0	1	1	0	0	0	0	2	2	3	3
2153	13.9	479072	5511071	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2154	8.6	509076	5514504	11	1	0	0	0	~300	1	0	4	25	0	0	0	0	0	0	0	2	2	2	2
2155	13.4	507860	5517772	23	4	0	0	0	~7000	0	0	5	38	0	1	1	0	0	5	5	10	10	16	16
2156	12.5	504536	5518142	0	0	0	0	0	~5000	0	0	4	33	0	0	0	0	0	0	0	1	1	1	1
2157	16.4	502489	5519451	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1
2158	12.6	502476	5518771	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2159	17.9	499828	5529404	0	0	0	0	0	3	0	0	0	0	1	0	0	1	1	0	0	1	1	2	2
2160	15.8	495309	5534610	0	0	0	0	0	5	0	0	0	0	0	1	1	0	0	0	0	1	1	2	2
2161	14.8	494336	5536057	2	0	0	0	0	3	0	0	4	14	0	1	1	1	1	1	1	3	3	6	6
2162	13.2	471957	5555521	0	0	0	0	0	~30	0	0	0	0	0	1	1	0	0	0	0	1	1	2	2
2163	10.6	469340	5556829	3	0	0	0	0	0	0	0	3	107	2	6	6	0	0	1	1	2	2	9	9
2164	8.3	470775	5560576	5	0	0	0	0	~1000	0	0	6	9	0	1	1	0	0	0	0	1	1	2	2
2165	10.8	502151	5526219	2	0	0	0	0	~15	0	0	4	8	0	2	2	1	1	0	0	11	11	14	14
2166	12.4	469722	5563399	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2167	12.6	467168	5566188	0	0	0	0	0	~60	0	0	4	12	0	0	0	0	0	1	1	0	0	1	1
2168	7.6	466761	5571750	4	0	0	0	0	~300	0	0	14	200	0	1	1	2	2	2	2	2	2	7	7
2169	10.8	466874	5575104	10	0	0	0	0	~200	0	0	14	30	2	1	1	2	2	0	0	3	3	6	6
2170	15.6	470197	5571792	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2171	10.1	474194	5565417	6	0	0	0	0	~1000	0	1	3	11	0	2	2	0	0	0	0	3	3	5	5
2172	8.0	475679	5561963	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	1
2173	12.5	478630	5556471	0	0	0	0	0	~20	0	0	3	33	0	1	1	0	0	0	0	7	7	8	8
2174	10.4	454985	5591170	1	0	0	0	0	~20	0	0	2	6	1	1	1	0	0	0	0	1	1	2	2
2175	18.6	452249	5582787	1	0	0	0	0	1	0	0	0	0	0	1	1	1	1	0	0	8	8	10	10
2176	8.5	449810	5575205	5	0	0	0	0	~25	0	0	2	5	0	0	0	0	0	1	1	0	0	1	1
2177	7.6	448861	5568957	0	0	0	0	0	0	0	0	3	6	0	0	0	0	0	0	0	0	0	0	0
2178	6.5	476467	5542175	0	1	0	0	0	0	0	0	1	1	0	5	5	0	0	0	0	0	0	5	5

Sample	Corundum/Rutile				Silicates										Other		Carbonatite				
KAP-	Cor	Rub Cor	Saph Cor	Red Rutile	Cr-Gr/Uv	Cr-amph	Saph	Mn epid	% Spes	% Fay	% Opx	% Ky	% Sil	% St	Loell	Fluo	Bast	Per	Zirk	Par	Synch
2132	0	0	0	0	0	0	0	1	0	0	Tr	Tr	Tr	Tr	0	0	0	0	0	0	0
2133	0	0	0	0	0	0	0	0	0	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0
2134	0	1	0	0	0	0	0	0	0	0	1	Tr	Tr	Tr	0	0	0	0	0	0	0
2135	0	0	0	0	0	0	0	0	0	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0
2136	0	0	0	0	0	0	0	0	0	0	5	Tr	0	Tr	0	0	0	0	0	0	0
2137	0	0	0	0	0	0	0	0	0	0	3	Tr	Tr	Tr	0	0	0	0	0	0	0
2138	0	0	0	0	0	0	0	0	0	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0
2139	0	0	0	0	0	0	0	0	0	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0
2140	0	0	0	0	0	0	0	0	0	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0
2141	0	0	0	1	0	0	0	0	0	0	5	Tr	0	Tr	0	0	0	0	0	0	0
2142	0	1	0	6	0	0	0	0	0	0	Tr	Tr	Tr	Tr	0	0	0	0	0	0	0
2143	0	0	0	0	0	0	0	0	0	0	Tr	Tr	Tr	Tr	0	0	0	0	0	0	0
2144	0	0	0	0	0	0	0	0	0	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0
2145	0	0	1	0	0	0	0	0	0	0	2	Tr	Tr	0	0	0	0	0	0	0	0
2146	0	0	0	0	0	0	0	0	0	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0
2147	0	0	0	0	0	0	0	0	0	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0
2148	0	0	0	0	0	0	0	0	0	0	Tr	0	0	0	0	0	0	0	0	0	0
2149	0	0	0	3	0	0	0	0	0	0	Tr	Tr	0	2	0	0	0	0	0	0	0
2153	0	0	0	0	0	0	0	0	0	0	5	Tr	0	Tr	0	0	0	0	0	0	0
2154	0	0	0	0	1	0	0	1	0	0	Tr	Tr	0	Tr	1	0	0	0	0	0	0
2155	0	0	0	2	0	0	0	0	0	0	Tr	Tr	0	Tr	0	5	0	0	0	0	0
2156	0	0	0	0	0	0	0	0	0	0	Tr	0	0	Tr	0	0	0	0	0	0	0
2157	0	0	0	0	0	0	0	0	0	0	Tr	Tr	Tr	Tr	0	0	0	0	0	0	0
2158	0	0	0	0	0	0	0	0	0	0	0.5	0	Tr	Tr	0	0	0	0	0	0	0
2159	0	0	0	1	0	0	0	1	0	0	4	0	Tr	Tr	0	0	0	0	0	0	0
2160	0	0	0	0	0	0	0	0	0	0	Tr	Tr	Tr	0	0	0	0	0	0	0	0
2161	0	0	0	0	0	0	0	1	0	0	0.5	Tr	Tr	Tr	0	0	0	0	0	0	0
2162	0	0	0	0	0	0	0	0	0	0	Tr	Tr	Tr	Tr	0	0	0	0	0	0	0
2163	0	0	0	0	0	0	0	0	0	0	0	0.5	0	0	0	0	0	0	0	0	0
2164	0	0	0	0	0	0	0	0	0	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0
2165	0	0	0	4	0	0	0	0	0	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0
2166	0	0	0	0	0	0	0	0	0	0	3	Tr	0	Tr	0	0	0	0	0	0	0
2167	0	0	0	0	0	0	0	0	0	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0
2168	0	0	0	0	0	0	0	0	0	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0
2169	0	0	0	0	0	0	0	0	0	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0
2170	0	0	0	0	0	0	0	0	0	0	Tr	Tr	Tr	0	0	0	0	0	0	0	0
2171	0	2	0	0	0	0	0	0	0	0	3	Tr	0	Tr	0	0	0	0	0	0	0
2172	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
2173	0	0	0	0	0	0	0	0	0	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0
2174	0	2	0	1	0	0	0	0	0	0	Tr	Tr	Tr	0	0	0	0	0	0	0	0
2175	0	0	0	0	0	0	0	0	0	0	0.5	Tr	0	Tr	0	0	0	0	0	0	0
2176	0	0	0	0	0	0	0	0	0	0	0	Tr	0	0	0	0	0	0	0	0	0
2177	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
2178	0	0	0	0	0	0	0	0	0	0	0	0	0	Tr	0	0	0	0	0	0	0

Sample	Table	UTM		Sulphides						Spinel					Cr-Diopside									
KAP-	Feed (kg)	Easting	Northing	Cpy	Mol	Sph	Ars	Gal	Py	Gahnite MgO > 2%	Gahnite MgO < 2%	ChrOVL R	ChrOVL N	Spin	GI R	GI N	GII R	GII N	GIII R	GIII N	GIV R	GIV N	Pyx Total R	Pyx Total N
2179	9.9	448893	5563064	1	0	0	0	0	~150	0	0	7	8	0	0	0	0	0	0	0	0	0	0	0
2180	16.9	441996	5549633	1	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2181	6.9	452897	5566153	~900	0	0	0	0	~3500	2	0	2	2	1	2	2	2	2	4	4	9	9	17	17
2182	9.6	454147	5569265	~200	0	0	0	0	~2000	0	0	6	18	0	1	1	0	0	5	5	1	1	7	7
2183	9.5	458157	5578457	~150	0	0	0	0	~2000	2	1	8	120	1	2	2	1	1	2	2	2	2	7	7
2184	10.5	459514	5583895	~100	0	0	0	0	~7000	0	0	3	18	2	0	0	0	0	6	6	0	0	6	6
2185	10.0	466125	5597482	1	0	0	0	0	~25	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0
2186	8.1	463465	5591618	4	0	0	1	1	~1250	0	0	3	7	1	1	1	0	0	3	3	3	3	7	7
2187	7.0	463974	5581743	0	0	0	0	0	~1000	0	0	1	1	0	0	0	0	0	0	0	4	4	4	4
2188	11.3	468891	5578759	6	0	0	0	0	2	0	0	1	4	1	2	2	0	0	2	2	3	3	7	7
2189	16.9	456739	5550887	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2190	13.5	482060	5581525	0	0	0	0	0	~200	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0
2191	13.9	481251	5588500	1	0	0	0	0	~15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2192	9.6	479988	5594724	3	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	1	1	1	3	3
2193	6.9	493477	5594050	0	0	0	0	0	~25	0	0	0	0	0	0	0	0	0	2	2	1	1	3	3
2194	8.9	493967	5587702	3	0	0	0	0	~200	0	0	2	13	0	1	1	0	0	0	0	0	0	1	1
2195	11.4	494182	5584121	3	1	0	0	0	2	0	0	2	6	0	0	0	0	0	0	0	0	0	0	0
2196	11.7	493606	5581269	4	0	0	0	0	~300	0	0	11	50	0	0	0	0	0	0	0	2	2	2	2
2197	6.9	490038	5578762	2	0	0	0	0	~25	0	0	3	3	0	1	1	0	0	1	1	2	2	4	4
2198	10.2	491133	5575508	1	1	0	0	0	~20	0	0	1	6	0	0	0	0	0	0	0	0	0	0	0
2199	19.2	493944	5543328	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2200	15.7	495232	5543858	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2201	12.2	496926	5547699	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2202	16.8	498323	5550745	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1
2203	12.1	498434	5552419	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2204	15.7	496104	5557082	0	0	0	0	0	0	0	0	0	0	0	3	3	1	1	1	1	0	0	5	5
2205	15.6	496139	5560267	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	2	2
2206	7.5	497244	5563807	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2207	12.0	495178	5569536	3	0	0	0	0	10	1	1	5	57	0	1	1	0	0	0	0	4	4	5	5
2208	15.2	491031	5570637	1	0	0	0	0	2	0	0	1	2	0	0	0	0	0	0	0	1	1	1	1
2209	10.6	511911	5595221	2	0	0	0	0	~30	0	0	8	76	1	0	0	0	0	0	0	1	1	1	1
2210	15.1	516912	5589990	1	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2211	15.5	516753	5589118	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2212	8.6	519354	5584853	2	0	0	0	0	3	0	0	2	24	0	2	2	0	0	0	0	4	4	6	6
2213	8.5	520026	5583531	1	0	0	0	0	3	1	1	9	101	2	0	0	0	0	0	0	7	7	7	7
2214	15.6	520415	5579867	0	0	0	0	0	5	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0
2215	14.4	520250	5577305	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2216	13.9	520885	5575938	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0
2217	12.0	525561	5567412	0	0	0	3	0	4	0	0	3	20	0	0	0	0	0	0	0	11	11	11	11
2218	14.7	526074	5566365	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0
2219	7.0	525651	5565139	0	0	0	0	0	0	0	0	1	8	0	0	0	0	0	0	0	1	1	1	1
2220	8.5	519435	5592578	0	0	0	0	0	0	0	0	2	19	0	0	0	0	0	1	1	4	4	5	5
2221	10.7	521563	5588590	2	0	0	0	0	~15	0	0	4	47	0	0	0	0	0	0	0	13	13	13	13
2222	10.9	521900	5587894	2	0	0	0	0	10	0	0	6	50	0	0	0	0	0	0	0	0	0	0	0

Sample	Corundum/Rutile				Silicates										Other		Carbonatite				
KAP-	Cor	Rub Cor	Saph Cor	Red Rutile	Cr-Gr/Uv	Cr-amph	Saph	Mn epid	% Spes	% Fay	% Opx	% Ky	% Sil	% St	Loell	Fluo	Bast	Per	Zirk	Par	Synch
2179	0	1	0	0	0	0	0	0	0	0	0	Tr	0	Tr	0	0	0	0	0	0	0
2180	0	0	0	0	0	0	0	0	0	0	5	Tr	0	0	0	0	0	0	0	0	0
2181	0	0	0	0	0	0	0	0	Tr	0	Tr	Tr	Tr	Tr	0	0	0	0	0	0	0
2182	0	0	0	0	0	0	0	0	Tr	0	0	Tr	Tr	Tr	0	0	0	0	0	0	0
2183	0	0	0	0	0	0	1	0	0	0	1	Tr	0	0	0	0	0	0	0	0	0
2184	0	0	0	0	0	0	0	0	0	0	Tr	Tr	0	Tr	0	2	0	0	0	0	0
2185	0	0	0	0	0	0	0	0	Tr	0	Tr	0	0	Tr	0	3	0	0	0	0	0
2186	0	0	0	0	0	0	0	0	0	0	Tr	0.5	0	Tr	0	0	0	0	0	0	0
2187	0	0	0	0	0	0	0	0	0	0	0.5	Tr	0	Tr	0	1	0	0	0	0	0
2188	0	0	0	0	0	0	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0
2189	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0
2190	0	0	0	0	0	0	0	0	0	0	3	Tr	0	Tr	0	0	0	0	0	0	0
2191	0	0	0	0	0	0	0	0	0	0	1	Tr	Tr	Tr	0	0	0	0	0	0	0
2192	0	0	1	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
2193	0	0	0	5	0	0	0	0	0	0	1	Tr	Tr	Tr	0	0	0	0	0	0	0
2194	0	0	0	0	0	0	0	0	0	0	Tr	Tr	Tr	Tr	0	0	0	0	0	0	0
2195	0	0	0	0	0	0	0	0	Tr	0	Tr	Tr	Tr	Tr	0	0	0	0	0	0	0
2196	0	1	0	0	0	0	0	0	0	Tr	Tr	Tr	Tr	Tr	0	0	0	0	0	0	0
2197	0	0	0	7	0	0	0	0	0	0	Tr	Tr	Tr	Tr	0	0	0	0	0	0	0
2198	0	0	0	0	0	0	0	0	0	0	Tr	Tr	Tr	Tr	0	0	0	0	0	0	0
2199	0	0	0	0	0	0	0	0	0	0	15	Tr	0	0	0	0	0	0	0	0	0
2200	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0
2201	0	0	0	0	0	0	0	0	0	0	1	0	Tr	Tr	0	0	0	0	0	0	0
2202	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0
2203	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0
2204	0	0	0	0	1	0	0	0	0	0	1	Tr	Tr	Tr	0	0	0	0	0	0	0
2205	0	0	0	0	0	0	0	0	0	0	5	0	0	Tr	0	0	0	0	0	0	0
2206	0	0	0	0	0	0	0	0	0	0	Tr	Tr	Tr	Tr	0	0	0	0	0	0	0
2207	0	0	0	0	0	0	0	0	0	0	Tr	Tr	Tr	Tr	0	0	0	0	0	0	0
2208	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0
2209	0	0	0	0	0	0	0	0	Tr	0	Tr	0	Tr	Tr	0	0	0	0	0	0	0
2210	0	0	0	0	0	0	0	0	0	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0
2211	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
2212	0	0	0	0	0	0	0	0	0	0	2	Tr	Tr	Tr	0	0	0	0	0	0	0
2213	0	0	0	0	0	0	0	0	0	Tr	Tr	Tr	0	Tr	0	0	0	0	0	0	0
2214	0	0	0	0	0	0	0	0	0	0	5	0	Tr	Tr	0	0	0	0	0	0	0
2215	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0
2216	0	0	0	0	0	0	0	0	0	0	3	Tr	Tr	Tr	0	0	0	0	0	0	0
2217	0	0	0	0	0	0	0	0	0	0	Tr	Tr	Tr	Tr	0	0	0	0	0	0	0
2218	0	0	0	0	1	0	0	0	0	0	1	Tr	Tr	Tr	0	0	0	0	0	0	0
2219	0	0	0	0	0	0	0	0	0	0	Tr	Tr	Tr	Tr	0	0	0	0	0	0	0
2220	0	0	0	0	0	0	1	0	0	0	Tr	Tr	Tr	Tr	0	0	0	0	0	0	0
2221	0	0	0	0	0	0	0	0	0	0	Tr	Tr	Tr	Tr	0	0	0	0	0	0	0
2222	0	0	0	0	0	0	0	0	0	0	Tr	Tr	0	Tr	0	1	0	0	0	0	0

Sample	Table	UTM		Sulphides						Spinel					Cr-Diopside									
KAP-	Feed (kg)	Easting	Northing	Cpy	Mol	Sph	Ars	Gal	Py	Gahnite MgO > 2%	Gahnite MgO < 2%	ChrOVL R	ChrOVL N	Spin	GI R	GI N	GII R	GII N	GIII R	GIII N	GIV R	GIV N	Pyx Total R	Pyx Total N
2223	13.1	523864	5585555	0	0	0	0	0	4	0	0	2	3	0	0	0	0	0	0	0	1	1	1	1
2224	8.2	524288	5584860	3	0	0	0	0	8	0	0	3	20	0	1	1	0	0	0	0	1	1	2	2
2225	14.4	527047	5580070	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	1	1	1	1	2	2
2226	4.7	529079	5577938	3	0	0	0	0	2	0	0	3	6	0	0	0	1	1	0	0	5	5	6	6
2227	10.7	534209	5576092	2	0	0	0	0	3	0	0	2	5	0	0	0	0	0	1	1	5	5	6	6
2228	16.2	535724	5573701	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2229	8.6	534530	5570826	0	0	0	0	0	9	0	1	5	47	0	0	0	0	0	0	0	1	1	1	1
2230	9.6	535026	5565198	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1
2231	11.8	526116	5560640	1	0	0	0	0	5	0	0	1	1	0	0	0	0	0	0	0	11	11	11	11
2232	13.7	526719	5558479	0	0	0	0	0	7	1	0	9	18	0	2	2	0	0	2	2	6	6	10	10
2233	11.5	501096	5577285	2	0	0	0	0	~20	0	0	1	1	1	0	0	6	6	0	0	2	2	8	8
2234	15.5	499895	5580520	3	0	0	0	0	~20	0	0	0	0	0	0	0	2	2	1	1	2	2	5	5
2235	13.6	504353	5593936	1	0	0	0	0	~20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2236	14.6	505245	5593415	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	9	9	9	9
2237	9.4	506479	5591131	0	0	0	0	0	~20	0	0	2	8	0	0	0	0	0	0	0	1	1	1	1
2238	16.5	508230	5589799	1	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3
2239	16.8	508963	5588090	0	0	0	0	0	7	1	0	1	1	0	0	0	0	0	0	0	1	1	1	1
2240	8.2	508362	5587560	2	0	0	0	0	2	0	0	6	20	0	1	1	0	0	2	2	16	16	19	19
2241	12.3	508904	5585493	1	0	0	0	0	1	0	0	1	2	0	0	0	0	0	0	0	6	6	6	6
2242	9.0	509322	5583329	1	0	0	0	0	3	0	0	6	38	0	0	0	0	0	0	0	5	5	5	5
2243	10.7	511537	5578316	3	0	0	0	0	9	0	0	3	15	0	0	0	0	0	1	1	1	1	2	2
2245	10.4	513304	5574741	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3
2246	13.9	514292	5573479	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2247	11.4	514247	5568668	1	0	0	0	0	3	0	0	1	2	0	0	0	0	0	1	1	2	2	3	3
2248	9.3	514032	5566247	1	0	0	0	0	5	0	0	2	8	0	0	0	0	0	0	0	4	4	4	4
2249	9.2	512882	5560827	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	4	4	5	5
2250	19.1	505720	5561281	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	5	5	5	5
2251	11.2	497096	5564354	1	0	0	0	0	~1300	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1
2252	9.3	494172	5569708	12	0	0	3	0	~50	0	1	5	11	0	5	5	1	1	1	1	20	20	27	27
2264	11.3	514179	5487239	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2265	10.8	527957	5483816	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2266	10.7	534594	5484358	0	0	0	0	0	8	0	0	4	30	0	0	0	0	0	1	1	1	1	2	2
2267	7.5	535820	5484321	6	1	0	0	0	~15	0	0	1	10	0	0	0	0	0	1	1	1	1	2	2
2270	10.3	526374	5552670	0	1	0	0	0	5	0	0	9	44	0	1	1	0	0	0	0	3	3	4	4
2271	15.4	529998	5551553	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2272	15.9	530929	5551574	0	1	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1
2273	13.8	533407	5548348	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1
2274	12.5	533292	5548953	0	0	0	0	0	0	1	0	7	15	0	1	1	0	0	1	1	8	8	10	10
2275	12.0	531963	5548912	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1
2276	10.0	533681	5540952	1	0	0	0	0	10	0	0	4	69	0	2	2	0	0	0	0	1	1	3	3
2277	8.7	533716	5540948	0	0	0	0	0	2	0	0	9	77	0	0	0	0	0	1	1	1	1	2	2
2278	13.1	533133	5546165	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	13	13	13	13
2279	13.0	533140	5545388	3	0	0	0	0	2	0	0	7	60	0	0	0	0	0	0	0	1	1	1	1
2280	11.3	533749	5541315	1	0	0	0	0	3	0	0	0	0	0	1	1	0	0	0	0	5	5	6	6

Sample	Corundum/Rutile				Silicates										Other		Carbonatite				
KAP-	Cor	Rub Cor	Saph Cor	Red Rutile	Cr-Gr/Uv	Cr-amph	Saph	Mn epid	% Spes	% Fay	% Opx	% Ky	% Sil	% St	Loell	Fluo	Bast	Per	Zirk	Par	Synch
2223	0	0	0	0	0	0	0	0	0	0	3	0	Tr	Tr	0	0	0	0	0	0	0
2224	0	0	0	1	0	0	0	1	0	0	1	0	Tr	Tr	0	0	0	0	0	0	0
2225	0	0	0	0	0	0	0	0	0	0	2	Tr	0	Tr	0	0	0	0	0	0	0
2226	0	0	0	0	0	0	0	1	0	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0
2227	0	1	0	0	0	0	0	0	0	0	1	Tr	Tr	Tr	0	0	0	0	0	0	0
2228	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0
2229	0	0	0	0	0	0	0	0	0	0	Tr	Tr	Tr	Tr	0	0	0	0	0	0	0
2230	0	0	0	0	0	0	0	0	0	0	Tr	Tr	Tr	Tr	0	0	0	0	0	0	0
2231	0	0	0	0	0	0	0	0	0	0	Tr	Tr	Tr	Tr	0	0	0	0	0	0	0
2232	0	0	0	0	0	0	0	0	0	0	1	Tr	Tr	Tr	0	0	0	0	0	0	0
2233	0	0	1	0	0	0	0	0	0	0	7	Tr	Tr	Tr	0	6	0	0	0	1	0
2234	0	0	0	0	0	0	0	0	0	0	2	Tr	Tr	Tr	0	0	0	0	0	0	0
2235	0	0	0	0	0	0	0	0	0	0	1	Tr	Tr	Tr	0	0	0	0	0	0	0
2236	0	0	0	0	0	0	0	0	0	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0
2237	0	0	0	0	0	0	0	0	0	0	Tr	Tr	Tr	1	0	0	0	0	0	0	0
2238	0	1	0	0	0	0	0	0	0	0	Tr	Tr	Tr	Tr	0	0	0	0	0	0	0
2239	0	0	0	0	0	0	0	0	0	0	1	Tr	Tr	Tr	0	0	0	0	0	0	0
2240	0	1	0	0	0	0	0	0	0	0	Tr	Tr	Tr	Tr	0	0	0	0	0	0	0
2241	0	1	0	0	0	0	0	0	0	0	Tr	Tr	Tr	Tr	0	0	0	0	0	0	0
2242	0	1	0	1	0	0	0	0	0	0	2	Tr	Tr	2	0	0	0	0	0	0	0
2243	0	0	0	0	0	0	0	0	0	0	Tr	Tr	Tr	Tr	0	0	0	0	0	0	0
2245	0	0	0	0	0	0	0	0	0	0	Tr	Tr	Tr	Tr	0	0	0	0	0	0	0
2246	0	0	0	0	0	0	0	0	0	0	0	0	Tr	0	0	0	0	0	0	0	0
2247	0	1	0	0	1	0	0	0	0	0	1	Tr	Tr	Tr	0	0	0	0	0	0	0
2248	0	0	0	0	0	0	0	0	0	0	Tr	Tr	Tr	Tr	0	0	0	0	0	0	0
2249	0	0	0	0	0	0	0	0	0	0	0.5	Tr	Tr	Tr	0	0	0	0	0	0	0
2250	0	0	0	0	0	0	0	0	0	0	0.5	Tr	0	0.5	0	1	0	0	0	0	0
2251	0	0	0	1	1	0	0	0	0	0	3	Tr	Tr	Tr	0	0	0	0	0	0	0
2252	0	0	0	0	0	0	0	1	0	0	1	Tr	Tr	Tr	0	0	0	0	0	0	0
2264	0	0	0	0	0	0	0	0	0	0	Tr	0	0	Tr	0	0	0	0	0	0	0
2265	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0
2266	0	0	0	0	0	0	0	0	0	0	Tr	Tr	Tr	Tr	0	0	0	0	0	0	0
2267	0	2	0	0	0	0	0	0	Tr	0	2	Tr	0	Tr	0	0	0	0	0	0	0
2270	0	0	0	0	0	0	0	0	0	0	Tr	Tr	Tr	Tr	0	0	0	0	0	0	0
2271	0	0	0	0	0	0	0	0	0	0	Tr	Tr	0	0	0	0	0	0	0	0	0
2272	0	0	0	0	0	0	0	0	0	0	5	Tr	0	Tr	0	0	0	0	0	0	0
2273	0	0	0	0	0	0	0	0	0	0	2	Tr	0	Tr	0	0	0	0	0	0	0
2274	0	0	0	0	0	0	0	0	0	0	Tr	Tr	Tr	Tr	0	0	0	0	0	0	0
2275	0	0	0	0	0	0	0	0	0	0	2	Tr	Tr	Tr	0	0	0	0	0	0	0
2276	0	0	0	0	0	0	0	0	0	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0
2277	0	0	0	0	0	0	0	0	0	0	Tr	Tr	Tr	Tr	0	0	0	0	0	0	0
2278	0	0	0	0	0	0	0	0	0	0	0.5	Tr	0	Tr	0	0	0	0	0	0	0
2279	0	0	0	0	0	0	0	0	0	0	Tr	Tr	Tr	Tr	0	0	0	0	0	0	0
2280	0	0	0	0	0	0	0	0	0	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0

Sample	Table	UTM		Sulphides						Spinel					Cr-Diopside									
KAP-	Feed (kg)	Easting	Northing	Cpy	Mol	Sph	Ars	Gal	Py	Gahnite MgO > 2%	Gahnite MgO < 2%	ChrOVL R	ChrOVL N	Spin	GI R	GI N	GII R	GII N	GIII R	GIII N	GIV R	GIV N	Pyx Total R	Pyx Total N
2281	13.2	534533	5536570	0	0	0	0	0	3	0	0	3	3	0	0	0	2	2	0	0	3	3	5	5
2282	13.2	535356	5532881	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	1
2283	12.6	535588	5532389	1	0	0	0	0	~80	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1
2291	16.1	516297	5567792	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	5	5	6	6
2292	13.0	515107	5543193	0	0	0	0	0	3	0	0	2	4	0	0	0	0	0	0	0	0	0	0	0
2293	14.5	517309	5539010	0	0	0	0	0	5	0	0	1	2	1	1	1	0	0	1	1	16	16	18	18
2294	15.3	523038	5540141	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2295	15.5	510797	5543107	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	4	4	4	4
2296	10.2	508556	5553197	2	0	0	0	0	~20	0	0	2	5	2	0	0	0	0	0	0	3	3	3	3
2297	12.8	508948	5557168	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	0	0	1	1	2	2
2298	14.9	503829	5565287	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	2	2	4	4
2299	11.0	501131	5566491	1	1	0	0	0	3	0	0	2	3	0	0	0	0	0	0	0	6	6	6	6
2300	14.2	497125	5572995	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	8	8	8
2301	15.3	490871	5571579	4	0	0	0	0	6	0	0	0	0	0	0	0	1	1	1	1	9	9	11	11
2302	8.6	479006	5556209	0	0	0	0	0	~50	1	2	6	93	0	2	2	0	0	4	4	4	4	10	10
2303	5.2	479094	5556201	0	0	0	0	0	0	0	0	2	5	0	0	0	0	0	0	0	1	1	1	1
2304	10.4	480805	5554778	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	6	6	6
2305	7.6	483236	5551268	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0
2306	12.6	469032	5539409	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	2	3	3
2335	19.5	530862	5491313	2	0	0	0	0	3	0	0	2	2	0	0	0	1	1	1	1	20	20	22	22
2336	14.0	531895	5486133	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	2	2
2337	9.0	510424	5483477	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2344	19.5	512677	5575236	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2349	13.7	517392	5507387	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0
2350	13.5	527591	5531414	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2351	11.3	529159	5535932	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2352	14.0	530043	5537443	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	1	1	0	0	1	1
2353	14.5	525625	5511154	0	0	0	0	0	~150	0	0	5	9	0	0	0	0	0	1	1	15	15	16	16
2354	14.0	527572	5510988	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2355	16.9	528677	5506452	1	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2356	12.0	529770	5504584	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2357	20.3	532433	5502860	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2360	16.1	527673	5476199	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2401	11.2	511329	5498566	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2402	15.5	514432	5497685	0	0	0	0	0	~25	0	0	1	1	1	2	2	3	3	2	2	20	20	27	27
2403	14.3	521647	5490659	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1
2404	18.2	528232	5485016	1	0	0	0	0	8	0	0	1	4	0	0	0	1	1	0	0	1	1	2	2
2406	14.6	514906	5486860	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2407	17.8	520456	5486313	2	0	0	0	0	~25	1	0	0	0	0	5	5	1	1	2	2	14	14	22	22
2408	14.2	523661	5483578	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2414	13.2	508968	5489862	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2415	13.8	513283	5494244	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3
2416	11.1	513531	5508281	12	0	0	0	0	~25	0	0	1	12	0	0	0	0	0	0	0	8	8	8	8
2417	18.3	521316	5507397	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1

Sample	Corundum/Rutile				Silicates										Other		Carbonatite				
KAP-	Cor	Rub Cor	Saph Cor	Red Rutile	Cr-Gr/Uv	Cr-amph	Saph	Mn epid	% Spes	% Fay	% Opx	% Ky	% Sil	% St	Loell	Fluo	Bast	Per	Zirk	Par	Synch
2281	0	0	0	0	0	0	0	0	0	0	2	Tr	Tr	Tr	0	0	0	0	0	0	0
2282	0	0	0	0	0	0	0	0	0	0	Tr	Tr	Tr	Tr	0	0	0	0	0	0	0
2283	0	0	0	0	0	0	0	0	0	0	Tr	Tr	Tr	0	0	0	0	0	0	0	0
2291	0	0	0	0	0	0	0	0	0	0	3	Tr	0	0	0	0	0	0	0	0	0
2292	0	0	0	0	0	0	0	0	0	0	Tr	Tr	Tr	Tr	0	0	0	0	0	0	0
2293	0	0	0	0	0	0	0	0	0	0	1	Tr	0	Tr	0	0	0	0	0	0	0
2294	0	0	0	0	0	0	0	0	0	0	2	Tr	0	0	0	0	0	0	0	0	0
2295	0	0	0	0	0	0	0	0	0	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0
2296	0	0	0	0	0	0	0	0	0	0	Tr	Tr	Tr	Tr	0	0	0	0	0	0	0
2297	0	0	0	0	0	0	0	0	0	0	1	Tr	0	Tr	0	0	0	0	0	0	0
2298	0	0	0	0	0	0	0	0	0	0	2	Tr	0	Tr	0	0	0	0	0	0	0
2299	0	0	0	0	0	0	0	0	0	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0
2300	0	0	0	0	0	0	0	0	0	0	Tr	Tr	Tr	Tr	0	0	0	0	0	0	0
2301	0	0	0	0	0	0	0	0	0	0	Tr	Tr	Tr	Tr	0	0	0	0	0	0	0
2302	0	2	0	~30	0	0	0	0	0	0	0	Tr	Tr	Tr	0	0	0	0	0	0	0
2303	0	0	0	0	1	0	0	0	0	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0
2304	0	0	0	0	0	0	0	0	0	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0
2305	0	0	0	0	0	0	0	0	0	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0
2306	0	0	0	0	0	0	0	0	0	0	1	Tr	Tr	0	0	0	0	0	0	0	0
2335	0	0	0	0	1	0	0	0	0	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0
2336	0	0	0	0	0	0	0	0	0	0	Tr	0	Tr	0	0	0	0	0	0	0	0
2337	0	0	0	0	0	0	0	0	0	0	0.5	Tr	0	Tr	0	0	0	0	0	0	0
2344	0	0	0	0	0	0	0	0	0	0	1	Tr	0	Tr	0	0	0	0	0	0	0
2349	0	0	0	0	0	0	0	0	0	0	Tr	0	Tr	0	0	0	0	0	0	0	0
2350	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2351	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2352	0	0	0	0	0	0	0	0	0	0	Tr	0	Tr	0	0	0	0	0	0	0	0
2353	0	0	0	0	0	0	0	0	0	0	Tr	Tr	0	0	0	0	0	0	0	0	0
2354	0	0	0	0	0	0	0	0	0	0	Tr	0	0	0	0	0	0	0	0	0	0
2355	0	0	0	0	0	0	0	0	0	0	0.5	0	Tr	Tr	0	0	0	0	0	0	0
2356	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2357	0	0	0	0	0	0	0	0	0	0	2	0	0	Tr	0	0	0	0	0	0	0
2360	0	0	0	0	0	0	0	0	0	0	8	0	0	Tr	0	0	0	0	0	0	0
2401	0	0	0	0	0	0	0	0	0	0	Tr	0	0	0	0	0	0	0	0	0	0
2402	0	0	0	0	1	0	0	0	0	0	Tr	Tr	0	0	0	0	0	0	0	0	0
2403	0	0	0	0	0	0	0	0	0	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0
2404	0	0	0	0	0	0	0	0	0	0	3	0	0	Tr	0	0	0	0	0	0	0
2406	0	0	0	0	0	0	0	0	0	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0
2407	0	1	0	0	0	0	0	1	0	0	Tr	Tr	Tr	Tr	0	0	0	0	0	0	0
2408	0	0	0	0	0	0	0	0	0	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0
2414	0	0	0	0	0	0	0	0	0	0	Tr	Tr	0	0	0	0	0	0	0	0	0
2415	0	0	0	0	0	0	0	0	0	0	Tr	Tr	0	Tr	0	0	0	0	0	0	0
2416	0	1	0	0	0	0	0	0	0	0	1	Tr	Tr	Tr	0	0	0	0	0	0	0
2417	0	0	0	0	0	0	0	0	0	0	0.5	0	0	0	0	0	0	0	0	0	0

Sample	Table	UTM		Sulphides						Spinel					Cr-Diopside									
KAP-	Feed (kg)	Easting	Northing	Cpy	Mol	Sph	Ars	Gal	Py	Gahnite MgO > 2%	Gahnite MgO < 2%	ChrOVL R	ChrOVL N	Spin	GI R	GI N	GII R	GII N	GIII R	GIII N	GIV R	GIV N	Pyx Total R	Pyx Total N
2418	14.7	520058	5506026	6	0	0	0	0	~1000	0	0	8	66	0	0	0	0	0	0	0	2	2	2	2
2419	12.9	524351	5501224	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Sample	Corundum/Rutile				Silicates										Other		Carbonatite				
KAP-	Cor	Rub Cor	Saph Cor	Red Rutile	Cr-Gr/Uv	Cr-amph	Saph	Mn epid	% Spes	% Fay	% Opx	% Ky	% Sil	% St	Loell	Fluo	Bast	Per	Zirk	Par	Synch
2418	0	0	0	0	0	0	0	0	0	0	Tr	Tr	Tr	0	0	0	0	0	0	0	0
2419	0	0	0	0	0	0	0	0	0	0	Tr	Tr	0	0	0	0	0	0	0	0	0

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APPENDIX G : Numbers of Total, Reshaped, Modified and Pristine Gold Grains.

Sample KAP-	UTM		Gold			
	Easting	Northing	Total	Reshaped	Modified	Pristine
1523	512867	5497751	0	0	0	0
1524	519965	5488523	0	0	0	0
1530	524642	5484443	0	0	0	0
1631	461223	5539415	1	1	0	0
1632	460994	5540365	0	0	0	0
1633	459669	5541633	0	0	0	0
1634	459377	5542612	0	0	0	0
1635	458833	5545312	1	1	0	0
1636	458540	5548186	2	2	0	0
1637	456915	5549394	0	0	0	0
1638	456303	5553885	1	1	0	0
1648	465188	5514230	0	0	0	0
1649	464825	5516574	3	3	0	0
1650	464612	5517496	4	4	0	0
1677	464441	5551227	0	0	0	0
1678	465220	5550661	0	0	0	0
1679	473015	5549327	0	0	0	0
1680	468630	5534859	0	0	0	0
1681	464751	5532531	1	1	0	0
1682	465930	5530018	5	5	0	0
1683	464292	5547905	2	2	0	0
1684	459996	5546609	0	0	0	0
1685	483066	5540303	0	0	0	0
1686	479382	5547099	0	0	0	0
1687	478452	5548777	0	0	0	0
1897	394819	5542085	0	0	0	0
1910	406471	5544507	2	2	0	0
1911	410355	5548807	1	1	0	0
1912	393960	5553240	0	0	0	0
1913	401918	5553108	0	0	0	0
1914	406052	5558071	0	0	0	0
1915	402302	5563570	0	0	0	0
1916	398413	5565264	0	0	0	0
1917	399395	5566291	0	0	0	0
1922	421055	5541086	0	0	0	0
1923	423011	5548355	4	4	0	0
1924	419954	5549411	0	0	0	0
1925	430511	5558887	0	0	0	0
1927	399871	5568056	1	1	0	0
1928	399353	5571069	0	0	0	0
1929	401893	5576994	0	0	0	0
1930	401955	5582145	0	0	0	0
1931	396177	5591422	1	1	0	0
1932	411829	5592152	0	0	0	0
1933	405990	5588735	0	0	0	0
1934	406290	5582250	0	0	0	0
1936	425795	5571040	4	4	0	0
1937	432029	5577391	0	0	0	0
1938	439838	5588640	0	0	0	0
1939	446174	5588884	0	0	0	0
1940	436218	5574353	1	1	0	0
1941	438027	5577933	0	0	0	0

Sample KAP-	UTM		Gold			
	Easting	Northing	Total	Reshaped	Modified	Pristine
1942	420877	5566515	2	2	0	0
1943	422806	5557467	0	0	0	0
1944	435036	5552307	1	1	0	0
1961	401666	5544566	0	0	0	0
1962	401689	5544647	0	0	0	0
1963	397547	5547477	0	0	0	0
1964	397690	5547585	2	2	0	0
1965	401098	5553925	0	0	0	0
1966	401151	5553987	2	2	0	0
1967	403606	5551931	0	0	0	0
1968	403106	5559836	0	0	0	0
1969	400292	5564712	2	2	0	0
1970	394536	5563145	4	4	0	0
1974	427067	5546684	0	0	0	0
1975	422829	5548412	0	0	0	0
1976	422449	5554489	0	0	0	0
1977	423982	5559480	0	0	0	0
1978	422324	5559430	28	27	1	0
1979	421881	5566345	7	6	1	0
1980	399853	5570666	0	0	0	0
1981	399836	5570680	2	2	0	0
1982	401405	5576845	0	0	0	0
1983	402468	5581698	0	0	0	0
1984	398618	5585164	0	0	0	0
1985	416782	5595070	1	1	0	0
1986	416628	5593876	0	0	0	0
1987	409354	5590692	1	1	0	0
1988	407319	5590677	0	0	0	0
1989	406778	5588589	0	0	0	0
1990	408668	5579045	0	0	0	0
1991	429422	5576887	0	0	0	0
1992	438205	5581155	15	14	0	1
1993	439651	5581691	0	0	0	0
1994	444815	5584596	3	3	0	0
1995	451776	5595894	0	0	0	0
1996	434300	5569701	0	0	0	0
1997	424245	5567059	0	0	0	0
1998	424700	5559703	0	0	0	0
1999	413355	5557753	1	1	0	0
2000	438733	5552120	1	1	0	0
2003	437282	5541156	0	0	0	0
2004	435729	5540763	0	0	0	0
2037	459086	5539256	0	0	0	0
2039	466633	5534563	1	1	0	0
2041	457069	5539514	0	0	0	0
2043	469593	5534222	0	0	0	0
2044	472319	5533579	0	0	0	0
2045	474077	5534369	0	0	0	0
2046	473939	5535175	0	0	0	0
2047	470267	5534266	0	0	0	0
2048	472841	5533678	0	0	0	0
2049	477355	5538207	0	0	0	0

Sample KAP-	UTM		Gold			
	Easting	Northing	Total	Reshaped	Modified	Pristine
2050	481721	5530323	0	0	0	0
2051	484405	5526180	0	0	0	0
2052	487363	5523030	0	0	0	0
2053	489214	5520199	0	0	0	0
2054	492147	5513357	1	1	0	0
2055	496164	5512109	0	0	0	0
2056	498950	5509544	0	0	0	0
2057	508372	5495381	0	0	0	0
2058	509697	5496613	0	0	0	0
2059	506934	5499538	0	0	0	0
2060	507088	5501291	0	0	0	0
2061	478941	5533410	0	0	0	0
2062	481525	5528256	0	0	0	0
2063	485349	5525501	0	0	0	0
2064	488719	5522103	0	0	0	0
2065	489617	5515173	0	0	0	0
2066	494866	5513289	0	0	0	0
2067	497420	5510644	1	1	0	0
2068	501087	5505848	0	0	0	0
2069	508652	5498290	0	0	0	0
2070	506934	5500167	0	0	0	0
2071	506843	5502868	1	0	1	0
2072	504012	5505259	0	0	0	0
2073	502318	5505747	0	0	0	0
2074	509301	5514300	0	0	0	0
2081	465205	5520088	1	1	0	0
2082	509341	5514995	1	1	0	0
2083	509033	5516530	0	0	0	0
2084	509983	5494064	0	0	0	0
2085	506653	5518142	0	0	0	0
2086	506610	5518072	0	0	0	0
2087	504267	5503457	2	2	0	0
2088	503844	5503747	0	0	0	0
2089	502524	5505492	0	0	0	0
2090	510778	5512509	0	0	0	0
2094	503101	5519662	0	0	0	0
2095	501707	5519969	0	0	0	0
2096	502284	5523948	0	0	0	0
2097	501651	5527279	0	0	0	0
2098	498116	5533502	0	0	0	0
2099	494348	5535251	0	0	0	0
2100	493956	5540988	0	0	0	0
2101	475553	5544162	0	0	0	0
2103	473493	5547560	1	1	0	0
2104	470671	5555602	0	0	0	0
2105	468281	5558536	1	1	0	0
2106	454579	5590358	4	4	0	0
2107	451493	5579407	0	0	0	0
2108	449465	5573011	0	0	0	0
2109	471315	5562100	0	0	0	0
2110	468090	5565385	3	3	0	0
2111	466819	5568027	0	0	0	0

Sample KAP-	UTM		Gold			
	Easting	Northing	Total	Reshaped	Modified	Pristine
2112	467121	5573043	0	0	0	0
2113	469223	5573725	2	2	0	0
2114	471858	5568036	0	0	0	0
2115	474272	5563333	0	0	0	0
2116	476010	5558054	0	0	0	0
2117	449484	5572997	1	1	0	0
2118	448220	5566309	1	1	0	0
2119	446527	5549826	0	0	0	0
2120	446078	5547612	0	0	0	0
2121	452831	5568080	0	0	0	0
2122	455648	5574204	60	60	0	0
2123	457190	5576412	0	0	0	0
2124	459856	5583521	0	0	0	0
2125	461286	5588835	0	0	0	0
2126	460492	5590876	3	3	0	0
2127	467314	5599621	0	0	0	0
2128	463883	5586120	0	0	0	0
2129	465193	5579205	1	1	0	0
2130	464954	5579027	0	0	0	0
2131	455601	5556416	1	1	0	0
2132	459525	5543301	0	0	0	0
2133	483954	5574831	0	0	0	0
2134	482464	5585415	0	0	0	0
2135	480199	5591870	0	0	0	0
2136	491966	5593994	1	1	0	0
2137	492489	5590566	0	0	0	0
2138	493734	5586833	1	1	0	0
2139	496550	5587419	0	0	0	0
2140	493330	5580379	0	0	0	0
2141	490787	5576907	1	1	0	0
2142	490512	5574226	0	0	0	0
2143	494420	5543651	0	0	0	0
2144	497176	5545750	0	0	0	0
2145	496807	5548535	0	0	0	0
2146	496977	5552792	0	0	0	0
2147	496991	5554835	0	0	0	0
2148	495844	5557358	0	0	0	0
2149	497385	5561625	2	2	0	0
2153	479072	5511071	0	0	0	0
2154	509076	5514504	0	0	0	0
2155	507860	5517772	0	0	0	0
2156	504536	5518142	0	0	0	0
2157	502489	5519451	0	0	0	0
2158	502476	5518771	0	0	0	0
2159	499828	5529404	0	0	0	0
2160	495309	5534610	0	0	0	0
2161	494336	5536057	0	0	0	0
2162	471957	5555521	1	1	0	0
2163	469340	5556829	2	2	0	0
2164	470775	5560576	0	0	0	0
2165	502151	5526219	0	0	0	0
2166	469722	5563399	0	0	0	0

Sample KAP-	UTM		Gold			
	Easting	Northing	Total	Reshaped	Modified	Pristine
2167	467168	5566188	0	0	0	0
2168	466761	5571750	0	0	0	0
2169	466874	5575104	2	2	0	0
2170	470197	5571792	0	0	0	0
2171	474194	5565417	0	0	0	0
2172	475679	5561963	0	0	0	0
2173	478630	5556471	1	1	0	0
2174	454985	5591170	0	0	0	0
2175	452249	5582787	0	0	0	0
2176	449810	5575205	0	0	0	0
2177	448861	5568957	0	0	0	0
2178	476467	5542175	0	0	0	0
2179	448893	5563064	1	1	0	0
2180	441996	5549633	0	0	0	0
2181	452897	5566153	0	0	0	0
2182	454147	5569265	0	0	0	0
2183	458157	5578457	0	0	0	0
2184	459514	5583895	0	0	0	0
2185	466125	5597482	0	0	0	0
2186	463465	5591618	0	0	0	0
2187	463974	5581743	0	0	0	0
2188	468891	5578759	0	0	0	0
2189	456739	5550887	0	0	0	0
2190	482060	5581525	0	0	0	0
2191	481251	5588500	0	0	0	0
2192	479988	5594724	0	0	0	0
2193	493477	5594050	0	0	0	0
2194	493967	5587702	0	0	0	0
2195	494182	5584121	0	0	0	0
2196	493606	5581269	0	0	0	0
2197	490038	5578762	0	0	0	0
2198	491133	5575508	0	0	0	0
2199	493944	5543328	0	0	0	0
2200	495232	5543858	2	2	0	0
2201	496926	5547699	0	0	0	0
2202	498323	5550745	0	0	0	0
2203	498434	5552419	0	0	0	0
2204	496104	5557082	1	1	0	0
2205	496139	5560267	0	0	0	0
2206	497244	5563807	0	0	0	0
2207	495178	5569536	0	0	0	0
2208	491031	5570637	0	0	0	0
2209	511911	5595221	0	0	0	0
2210	516912	5589990	0	0	0	0
2211	516753	5589118	0	0	0	0
2212	519354	5584853	0	0	0	0
2213	520026	5583531	1	1	0	0
2214	520415	5579867	0	0	0	0
2215	520250	5577305	0	0	0	0
2216	520885	5575938	0	0	0	0
2217	525561	5567412	0	0	0	0
2218	526074	5566365	0	0	0	0

Sample KAP-	UTM		Gold			
	Easting	Northing	Total	Reshaped	Modified	Pristine
2219	525651	5565139	0	0	0	0
2220	519435	5592578	1	1	0	0
2221	521563	5588590	0	0	0	0
2222	521900	5587894	1	1	0	0
2223	523864	5585555	0	0	0	0
2224	524288	5584860	0	0	0	0
2225	527047	5580070	0	0	0	0
2226	529079	5577938	0	0	0	0
2227	534209	5576092	0	0	0	0
2228	535724	5573701	0	0	0	0
2229	534530	5570826	0	0	0	0
2230	535026	5565198	0	0	0	0
2231	526116	5560640	0	0	0	0
2232	526719	5558479	0	0	0	0
2233	501096	5577285	1	1	0	0
2234	499895	5580520	0	0	0	0
2235	504353	5593936	0	0	0	0
2236	505245	5593415	0	0	0	0
2237	506479	5591131	0	0	0	0
2238	508230	5589799	0	0	0	0
2239	508963	5588090	0	0	0	0
2240	508362	5587560	0	0	0	0
2241	508904	5585493	0	0	0	0
2242	509322	5583329	0	0	0	0
2243	511537	5578316	0	0	0	0
2245	513304	5574741	0	0	0	0
2246	514292	5573479	0	0	0	0
2247	514247	5568668	1	1	0	0
2248	514032	5566247	1	1	0	0
2249	512882	5560827	0	0	0	0
2250	505720	5581281	0	0	0	0
2251	497096	5564354	0	0	0	0
2252	494172	5569708	0	0	0	0
2264	514179	5487239	0	0	0	0
2265	527957	5483816	0	0	0	0
2266	534594	5484358	0	0	0	0
2267	535820	5484321	1	1	0	0
2270	526374	5552670	0	0	0	0
2271	529998	5551553	0	0	0	0
2272	530929	5551574	0	0	0	0
2273	533407	5548348	0	0	0	0
2274	533292	5548953	0	0	0	0
2275	531963	5548912	1	1	0	0
2276	533681	5540952	0	0	0	0
2277	533716	5540948	0	0	0	0
2278	533133	5546165	5	5	0	0
2279	533140	5545388	2	2	0	0
2280	533749	5541315	0	0	0	0
2281	534533	5536570	0	0	0	0
2282	535356	5532881	0	0	0	0
2283	535588	5532389	0	0	0	0
2291	516297	5567792	0	0	0	0

Sample KAP-	UTM		Gold			
	Easting	Northing	Total	Reshaped	Modified	Pristine
2292	515107	5543193	0	0	0	0
2293	517309	5539010	0	0	0	0
2294	523038	5540141	0	0	0	0
2295	510797	5543107	0	0	0	0
2296	508556	5553197	0	0	0	0
2297	508948	5557168	2	2	0	0
2298	503829	5565287	0	0	0	0
2299	501131	5566491	0	0	0	0
2300	497125	5572995	0	0	0	0
2301	490871	5571579	1	1	0	0
2302	479006	5556209	0	0	0	0
2303	479094	5556201	0	0	0	0
2304	480805	5554778	0	0	0	0
2305	483236	5551268	0	0	0	0
2306	469032	5539409	0	0	0	0
2335	530862	5491313	0	0	0	0
2336	531895	5486133	0	0	0	0
2337	510424	5483477	0	0	0	0
2344	512677	5575236	0	0	0	0
2349	517392	5507387	0	0	0	0
2350	527591	5531414	0	0	0	0
2351	529159	5535932	1	1	0	0
2352	530043	5537443	0	0	0	0
2353	525625	5511154	0	0	0	0
2354	527572	5510988	1	1	0	0
2355	528677	5506452	0	0	0	0
2356	529770	5504584	0	0	0	0
2357	532433	5502860	0	0	0	0
2360	527673	5476199	0	0	0	0
2401	511329	5498566	0	0	0	0
2402	514432	5497685	0	0	0	0
2403	521647	5490659	0	0	0	0
2404	528232	5485016	0	0	0	0
2406	514906	5486860	0	0	0	0
2407	520456	5486313	0	0	0	0
2408	523661	5483578	0	0	0	0
2414	508968	5489862	0	0	0	0
2415	513283	5494244	0	0	0	0
2416	513531	5508281	0	0	0	0
2417	521316	5507397	2	1	0	1
2418	520058	5506026	0	0	0	0
2419	524351	5501224	0	0	0	0

Metric Conversion Table

Conversion from SI to Imperial			Conversion from Imperial to SI		
SI Unit	*Multiplied by*	*Gives*	*Imperial Unit*	*Multiplied by*	*Gives*
		LENGTH			
1 mm	0.039 37	inches	1 inch	**25.4**	mm
1 cm	0.393 70	inches	1 inch	**2.54**	cm
1 m	3.280 84	feet	1 foot	**0.304 8**	m
1 m	0.049 709	chains	1 chain	20.116 8	m
1 km	0.621 371	miles (statute)	1 mile (statute)	**1.609 344**	km
		AREA			
1 cm^2	0.155 0	square inches	1 square inch	**6.451 6**	cm^2
1 m^2	10.763 9	square feet	1 square foot	**0.092 903 04**	m^2
1 km^2	0.386 10	square miles	1 square mile	2.589 988	km^2
1 ha	2.471 054	acres	1 acre	0.404 685 6	ha
		VOLUME			
1 cm^3	0.061 023	cubic inches	1 cubic inch	**16.387 064**	cm^3
1 m^3	35.314 7	cubic feet	1 cubic foot	0.028 316 85	m^3
1 m^3	1.307 951	cubic yards	1 cubic yard	0.764 554 86	m^3
		CAPACITY			
1 L	1.759 755	pints	1 pint	0.568 261	L
1 L	0.879 877	quarts	1 quart	1.136 522	L
1 L	0.219 969	gallons	1 gallon	**4.546 090**	L
		MASS			
1 g	0.035 273 962	ounces (avdp)	1 ounce (avdp)	28.349 523	g
1 g	0.032 150 747	ounces (troy)	1 ounce (troy)	**31.103 476 8**	g
1 kg	2.204 622 6	pounds (avdp)	1 pound (avdp)	**0.453 592 37**	kg
1 kg	0.001 102 3	tons (short)	1 ton (short)	**907.184 74**	kg
1 t	1.102 311 3	tons (short)	1 ton (short)	**0.907 184 74**	t
1 kg	0.000 984 21	tons (long)	1 ton (long)	**1016.046 908 8**	kg
1 t	0.984 206 5	tons (long)	1 ton (long)	**1.016 046 90**	t
		CONCENTRATION			
1 g/t	0.029 166 6	ounce (troy)/ ton (short)	1 ounce (troy)/ ton (short)	34.285 714 2	g/t
1 g/t	0.583 333 33	pennyweights/ ton (short)	1 pennyweight/ ton (short)	1.714 285 7	g/t

OTHER USEFUL CONVERSION FACTORS

	Multiplied by	
1 ounce (troy) per ton (short)	31.103 477	grams per ton (short)
1 gram per ton (short)	0.032 151	ounces (troy) per ton (short)
1 ounce (troy) per ton (short)	20.0	pennyweights per ton (short)
1 pennyweight per ton (short)	0.05	ounces (troy) per ton (short)

Note: Conversion factors which are in bold type are exact. The conversion factors have been taken from or have been derived from factors given in the Metric Practice Guide for the Canadian Mining and Metallurgical Industries, published by the Mining Association of Canada in co-operation with the Coal Association of Canada.

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